AUGUST 10, 1922

# THE RUBBER AGE

VOL. XI. NO. 9

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THE
RUBBER AGE

VOL. XI AUGUST 25, 1922 No. 10

# Accelerated Aging Tests on Rubber Goods

## *A Valuable Means of Approximately Predicting the Relative Rate of Deterioration of Rubber Compounds*

By W. W. Evans

*Development Manager, The B. F. Goodrich Co.*

THE most prominent problem that has confronted the rubber chemist has been the prevention of deterioration of vulcanized rubber with age. Dealing as we do with a perishable vegetable material, there is no problem quite so important to the manufacturer and the consumer as the too rapid change in physical properties on standing. On account of this change in vulcanized rubber it has become common practice to build into various compositions excess properties beyond the real needs of service, in order to make allowance and leave after a period of time sufficient quality to withstand the service for which the articles were designed.

The first work done in the laboratories of the B. F. Goodrich Co. on accelerated aging tests was begun in the Fall of 1907 by Dr. W. C. Geer. He decided that the first step in the solution of this problem was a means by which the rate of deterioration could be predicted. Even though a knowledge of means of preservation was lacking, it would be at least possible to handle various materials entering into rubber goods so that the maximum life could be determined. This led to the study of accelerated aging tests and the final development of the one described in this paper.

FIG. 1—OVENS FOR ACCELERATED AGING TESTS

Full references to all the earlier work on this subject are contained in a paper presented before the International Rubber Congress at London in June, 1921. This paper appeared in the *English India Rubber Journal*, June 11, 1921, and was later reprinted in the *India Rubber World* under date of September 1, 1921.

After carrying on numerous experiments at different temperatures and after varying the periods of time, Geer found that 160° F. gave the most satisfactory results. Upon the basis of this work, the following procedure has been adopted and used in carrying out several thousands of such tests.

Into an oven, heated air was blown at a temperature of 160° F., care being taken to see that a continuous supply of hot fresh air was added during the entire aging period. A number of samples, 3/32 in. in thickness, were previously cut in the form of our standard test strip and placed in this air bath. As may be noted in Fig. 1, the test strips are suspended by punching a hole in the enlarged end, passing a wire through and placing between each strip a rubber disk which is about the same thickness as the test piece to keep the individual strips separated and allow a free circulation of air so that the entire surface is exposed.

The air was then started circulating and the test continued for a period of two weeks, taking out three samples each day. These were allowed to stand for twenty-four hours at room temperature until they reached a state of equilibrium, after which they were tested for tensile strength and elongation.

While a particular type of oven in which to perform these aging tests has been referred to, where a lesser number of tests are to be made and where a standard type of electric drying oven is available, this can be adapted to such work provided a mechanical agitator is placed inside the oven to insure an even temperature thoughout, and a constant supply of fresh air heated to 160° F. is maintained throughout the test. As an example of one of these electric ovens, the type known as the Freas, equipped with an electric agitator on the inside of the oven, has proven most satisfactory.

The data plotted in curve form give a time-decay curve of the compound. For a long time the tests were always run in comparison with a standard compound, that is, at least two sets of samples were run at the same time. Thus, by comparing the curve of a compound the age of which we knew, and the curve of a compound which we did not know, we obtained a reliable indication of the service to be expected from this new compound. It is worth while to point out that we consider this purely a practical and not an ultimate test. Our experience, however, based on many thousands of these curves indicates that this method of determining the approximate aging of a commercial rubber product is reliable, and is of great value as an aid to a compounder in a manufacturing plant, permitting him to study the aging of varying compositions.

No attempt has been made until recently to determine the probable chemical reactions involved. It seems reasonable to assume, however, at the temperature employed and with a current of fresh air passing over the samples, that oxidation occurs, forming one of the unstable peroxides and at the same

*Presented at the twenty-fifth annual meeting of the American Society for Testing Materials, held at Atlantic City, N. J., June 26-30, 1922.*

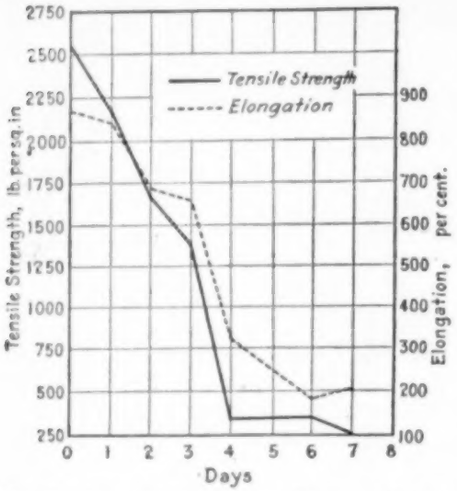



FIG. 2—ACCELERATED AGING TEST ON RUBBER THREAD

time causing an increase in the coefficient of vulcanization, similar to that resulting from the aging of rubber under normal conditions.

A few of the curves, taken from the records of the laboratory, have been selected which illustrate certain typical characteristics and of which natural aging data were available. The compound used in Fig. 2 is one of the older types so common in rubber thread. This curve shows the change in the elongation and in the tensile strength over a period of seven days. The curves are sharp and the deterioration was rapid. Fig. 3 shows the decay of the same compound, but of different cure. The heavy line is the curve plotted from the data taken from the strips that had been exposed in the aging cabinet. The broken line is the plot from data obtained from strips that had been filed away in a dark room kept at ordinary temperatures and in the dark, and test strips removed at intervals over a period of a little more than five years. From these curves, it is to be seen that the accelerated life test is somewhat more severe than the natural life test, although there is some degree of correspondence in the general shape of the curves.

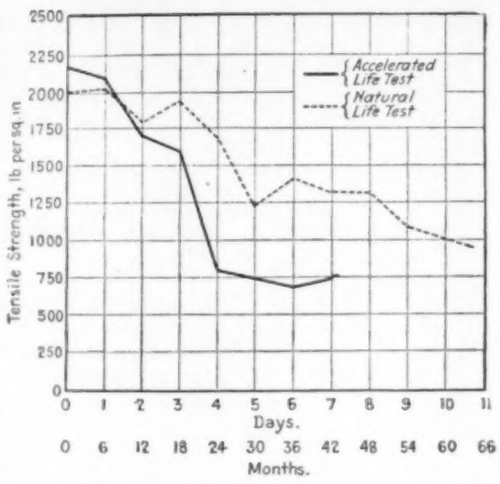



FIG. 3—COMPARISON OF ACCELERATED AGING AND NATURAL LIFE TESTS ON RUBBER THREADS

Fig. 4 shows a different compound and a different cure, and shows a wholly different type of aging curve. In this case, the tensile strength and elongation have remained at high levels, and one would judge this compound to be a good one. In point of fact it is a remarkably good one, and while we cannot show the curves from natural life it has stood the test of time in a highly satisfactory manner.

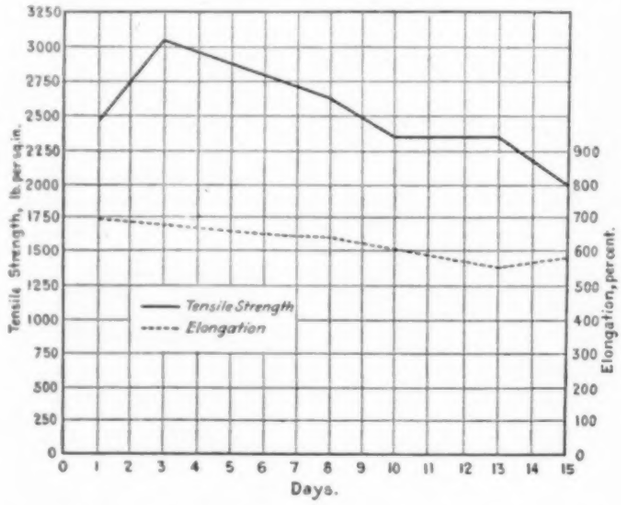



FIG. 4—ACCELERATED AGING TEST ON PNEUMATIC TIRE BREAKER STRIP FRICTION, CURED FOR 60 MINUTES AT 294 DEGREES F.

In Fig. 5 have been plotted data from the natural and short life tests for tensile strengths only. The compound is one of the older type composed of natural grades of rubber and litharge as the accelerator. The accelerated life test again shows more severe than the natural aging. These curves may be considered typical, and one of the general conclusions may be anticipated at this point, which is that when an accelerated aging curve shows a type where the tensile strength is nearly constant for the first three or four days and following that shows no severe decline, it is usual to find the natural life test to be at least as good, and usually better. Experience in judging curve data is necessary in comparing unknown with known compositions before any considerable volume of output may be predicated upon uncompared data.

Fig. 6 shows a relatively close comparison of accelerated and natural life tests of a lower grade composition.

Fig. 7 is the data of a lower grade compound, the natural life test for which was run but 24 months. The parallelism is fairly close. The fact of the tensile strength in the natural life tests being under those of the accelerated tests is probably due to differences in the original mixings.

Fig. 8 illustrates the effect of the test upon the stress-strain diagrams. The compounds are of the inner tube variety, that is to say composed of rubber, sulphur and accelerator. This figure is of a high grade type and shows high resistance to aging. There is, as will be observed, but little

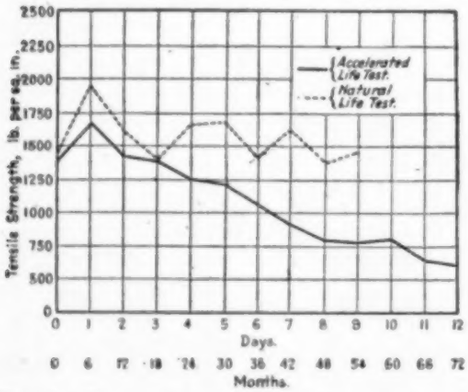



FIG. 5—COMPARISON OF ACCELERATED AGING AND NATURAL LIFE TESTS ON MOTOR CYCLE TIRE MATERIAL

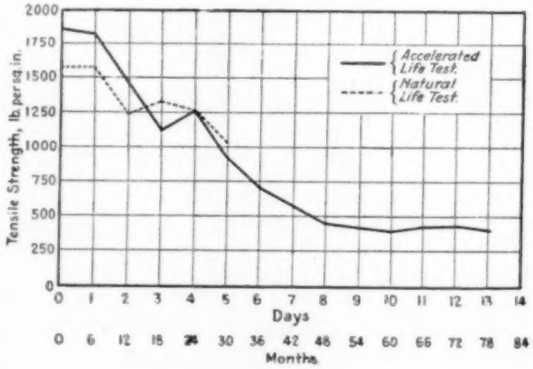



FIG. 6—COMPARISON OF ACCELERATED AGING AND NATURAL LIFE TESTS ON AIR BRAKE HOSE MATERIAL

change in the form of the curves. The compound has become stiffer and weaker.

In Fig. 9 is shown the results of the aging test upon a similar compound, but which resisted the effect of the heating to a lesser degree than the one shown in Fig. 8. There is very little that we can say regarding the effect of aging on the stress-strain curves. Our work has had to do more largely with the effect upon that more basic property, tensile strength.

### *Conclusions*

The results of several thousands of tests show that the accelerated test has proved to be a valuable means of approximately predicting the relative rate of deterioration of rubber compounds. In a general way the following conclusions were drawn:

1. We consider it more reliable to plot curves and compare them than to consider the percentage deterioration from the original tensile strength.

2. The samples in the accelerated aging test are not hardened as in actual aging, but are definitely weakened.

3. Sulphur changes are noticeable, but not important.

4. Despite the fact that the curves of accelerated and natural life tests are not exactly parallel, the accelerated life test is somewhat more severe in general than the natural life.

5. In the vast majority of cases, too rapid deterioration of rubber compounds is due to over or under cure, and chiefly over cure, than to any one or more compounding ingredients. The test has been of utmost value in indicating the proper cure. Troubles with organic accelerators, various grades of unfamiliar crude rubber, mineral fillers of various kinds, and so on, have been due chiefly to attempts to graft a new material upon an old practice and often with fatal results.

6. This test is a comparative and not an absolute one and should never be used to compare compounds of different type.

7. When used properly, there has been found to be an approximate correspondence between accelerated life and natural life tests after four days in the oven, of one day equalling six months.

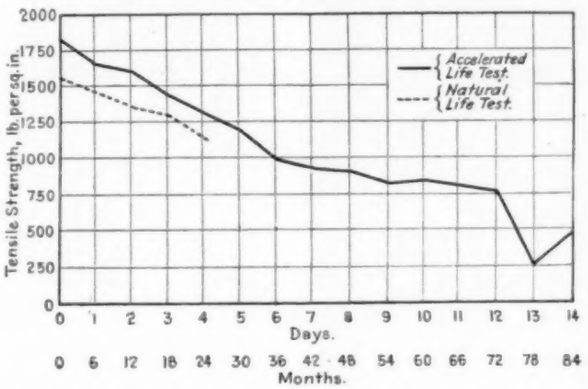



FIG. 7—COMPARISON OF ACCELERATED AGING AND NATURAL LIFE TESTS ON SOLID TRUCK TIRE MATERIAL

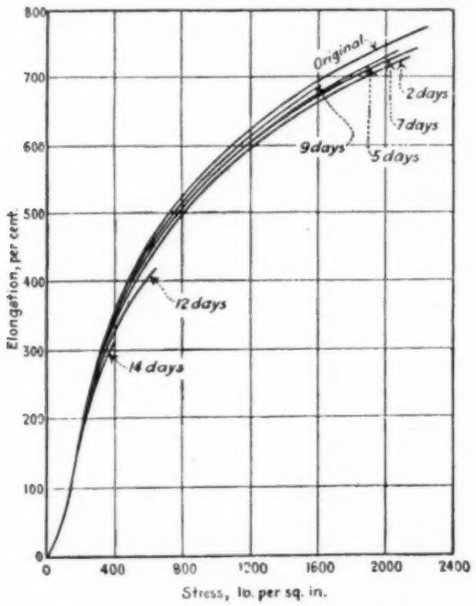



FIG. 8—STRESS-STRAIN DIAGRAMS IN ACCELERATED AGING TESTS. INNER TUBE MATERIAL

## Sponge Rubber for Heat Insulation

Sponge rubber, made by vulcanizing under a pressure of 100 atmospheres, may be successfully used for lining refrigerators to act as a heat insulator, according to recent tests by the National Physical Laboratory. Heat transmission through the double walls of ice-boxes lined with sponge rubber was found to be one-half of that which occurs when cork or other insulating material was used.

This seems to open a new field for rubber of this special character. Some compounds of rubber, cork and asbestos, might be applied effectively as a wall and floor insulator in dwelling houses and public buildings.

## Rubber Products

A process of making rubber products is patented by the Badische Anilin und Soda Fabrik in German Patent No. 33,496. The process is an improvement over the one, originally patented in German Patent No. 329,676. The polymerization of the hydrocarbons, in the process of manufacturing rubber synthetically, is carried out in the presence of aromatic hydroxyl or nitro compounds or other substances, which possess the property of hindering the oxidation of the synthetic rubber products. For example, 200 parts of 2, 3,-dimethylbutadiene 1, 3 are allowed to stand in contact with 2 parts of alkali-free sodium carbonate rubber derivative, which has been washed thoroughly and dried after its preparation from butadiene, and 2 parts of dipiperidyl. The mixture is kept in a closed vessel for a period of three weeks at a temperature of 65 degrees C. At the end of this time the entire flask is filled with a white foamy mass.

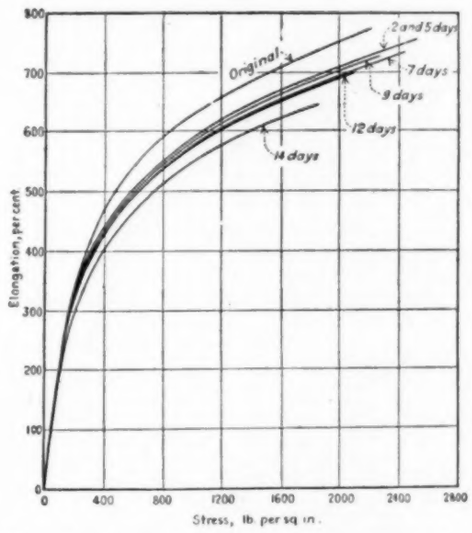



FIG. 9—STRESS-STRAIN DIAGRAMS IN ACCELERATED AGING TESTS. INNER TUBE MATERIAL

## Rubber Cylinders

In United States Patent No. 1,405,998 there is described a process for making a tubular structure of plastic material, to be used for example as covers for wringer rolls, jar rings, gaskets, etc. In the first step of the process a plastic tubular bank of elliptical cross-section is made and then reduced along the major axis of the ellipse by molding pressure exerted in the plane of the axis. The proper form of hollow roll is thus made. Apparatus for accomplishing the process is described.

# Scientific Management for Rubber Manufacturers

## Standardization

*The Fourth Article of the Series, Which Began in the June 10th Issue, Treats of a Topic of Vital Industrial Importance*

By Alfred Baruch

*Consulting Industrial Engineer, New York*

MOST men have a fairly good idea of what is meant by standardization but an investigation of the matter will show that the term is used very loosely and that it has been permitted to carry a meaning at times that does not belong to it at all and which is actually injurious to the whole movement of standardization.

To standardize is to limit, to define, and to establish units of measure. In the world at large standardization has been going on for hundreds of years. It arose out of necessity as most universal processes do. Probably the first act of standardization of which we have record is the adoption of a language common to a group of people. These people found that it was possible to communicate the same ideas, desires, and wishes to others by repeating the same sounds, and in time a common language appeared which was understood by all. The process has been going on steadily and will probably go on indefinitely. The introduction of set phrases into our language and the borrowing of foreign expressions are all a part of this great movement of standardization. The written alphabet and the money system, are both illustrations of world movement toward standardization.

### *Standardization Not New*

Most of these movements arose out of necessity and the people who were going through this process were unconscious of what they were actually doing. However, toward the end of the 18th Century the French Government appointed a commission of scientists to establish a definite system of weights and measures. After many years of study and experimentation, this commission finally evolved the metric system, which stands today exactly as it stood at the time of its inception. The reason that the metric system has never been changed is that its standards were arbitrarily selected and because they were dealing with an abstraction.

However, where the standards had to do with concrete things, they were changed as often as additional information became available. The whole field of natural science, as typified by physics, chemistry and geology are excellent examples of this fact. The standards of these sciences have been subject to constant change and none are more eager to discover flaws in the established systems than the scientists themselves. The most striking example of this fact today is the promulgation of Einstein's theory of relativity. If adopted as the hypothesis on which modern natural science is based, it will revolutionize physics, astronomy, geology and chemistry. It arose out of the general dissatisfaction that existed among scientists with the present hypotheses. On the face of it it is more satisfactory than those already existing. However, Einstein himself doubts the truth of his theories and is willing to submit them to any tests to establish or disprove them.

### *Distinction between Abstract and Concrete Standardization*

My readers may begin to wonder by now what the connection is between the foregoing and standardization of rubber factories. The explanation is an anticipation of the only objection that has yet been raised to complete standardization, namely, its supposed inflexibility. However, this objection has been raised by some people because they have misunderstood the consequences of the standardization as applied to industry and by others who deliberately misinterpret the results of standardization in this particular case, because they wish to offer a defense to the public, to their employers, and to their own consciences for their failure to do everything in their power to increase production and reduce costs.

Before going on with the general discussion I wish to point out the distinction between the two types of standardization illustrated above. The first type has to do with abstract matters and once the standards are agreed upon there is no necessity for further change. The metric system is designed so as to give a complete system of weights and measures in the simplest possible form. It is based on the number 10 and the multiples of this number, which, as everyone knows, is the easiest to calculate. It is simple and complete, and therefore needs no revision, since it cannot possibly make any difference to anyone what the unit of measure is as long as one exists.

The second type of standardization has to do with concrete matters. It is never arbitrarily arrived at but is based on actual facts as far as possible. For example, if we were trying to establish standards of production for carcass builders, it would be ridiculous to seize upon some arbitrary standards that have no basis in fact and try to set that up as a guide or a measure by which to determine the efficiency of the man. If a carcass builder can build only one 40 x 8 truck tire carcass in 8 hours, it would be absurd to set up a standard of two for 8 hours per man, simply because we would like to see him do it. There are two types of standards then, one arbitrary and inflexible, the other concrete and subject to constant change. If the carcass builder referred to above can build two carcasses in 14 hours after long practice, we would have to change the standard for this particular type of work.

Standardization as applied to industry is based on the concrete elements of which industry is composed. These are material, product, machinery, methods and cost. In each case they represent normal standards. By this is meant the combination of theory and practice to the extent where it will produce an article commercially useful.

Industry is not a bureau of research and is not interested in abstract ideas. Whenever manufacturers have attempted to depart from their true position, that of producers of marketable commodities, they have always met with disaster.

Consequently, in selecting standards for the various elements of production it is necessary to bear the ultimate objective in mind at all times. This is to produce an article that will sell and that will bring repeat orders. This can be done in only one way. The price must be low enough to meet competition and the quality must be high enough to satisfy the consumer. Any undertaking, then, that will achieve either or both of these objects is worthy of the most serious consideration. Standardization contributes definitely to both of these ends, as a brief examination of the matter will show.

### *Advantages of Standardization*

Standardization has three distinct advantages. (1) It reduces cost. (2) It produces an article of better quality. (3) It permits concentration on development of the product.

Standardization means, among other things, a reduction in

the variety and increase in the production of each type. The mere act of selecting a few types as against many serves to reduce the cost of production. Purchases can be made in greater quantity and more steadily. Naturally this means lower cost when compared with the cost of buying in small lots and expensively. An increase in the quality and a reduction in the number of types means that it is possible to make longer runs on the machines without changing the set-up. It also means that fewer machines are needed and also that a smaller investment in raw material supplies will suffice. By standardizing, the men acquire greater skill since they perform the same operations more frequently and their output naturally increases. Furthermore, they themselves are able to work more steadily than if they have to stop and change the product and start all over again many times during the day.

Standardization increases quality. In the first place it provides that the product shall come up to certain definite measurements and is consequently subjected to constant inspection. Because of the fewer types, accurate instruction is possible since mechanical gages can be developed where the work is of a uniform nature. But mechanical gages would be out of the question in the diversified work, especially in dealing with a flexible, resilient product like rubber. With a standardized product it is possible to introduce machine tools—the huge monsters that are too ignorant to make a mistake. An expensive machine tool is not profitable unless it can be used constantly and the only way that this can be done is to make a great many things the same way they are made at all times. Furthermore the individual workman acquires great skill by constant repetition and is soon able to turn out a high grade of product quite easily and rapidly where diversified work would require utmost attention and naturally move very slowly.

Standardization permits the highest development of the product. If only a few types are manufactured and these are produced in great quantity it is possible and profitable to devote a great deal of time to experimentation and to tests that will produce the highest quality of product. No better example of this exists than the rapid progress made in tires and tubes as soon as the Society of Automobile Engineers had adopted definite standards as to sizes and types, but there are many things besides tires and tubes to be standardized in the rubber district.

### *Disadvantages*

Before going any further, it would be well to discuss the disadvantages that have been ascribed to standardization. The first one is inflexibility. It is charged that once standards are adopted, the product as to machines and as to materials is too costly to change and therefore no advantage in this field. The previous discussion has no doubt dispelled this argument already, but the answer will be repeated. In the first place manufacturing standards are always based on concrete facts, on a man's capacity to produce, on the mechanical equipment available in the market, on the size of the plant, and so on. Any or all of these bases may change and the standards that govern them will have to change accordingly. Furthermore it was pointed out that standardization fosters development rather than hinders it.

It is also charged that standardization tends to make a machine out of a man and destroys his individuality. There is a certain amount of dishonesty in back of this argument which should be opposed at all times. It assumes that a man might make a rubber tire up to a certain measurement one time and a total different measurement the next time, simply as an expression of his individual character. This is absolutely untrue and furthermore is unjust to the workman. Labor is usually the first to complain and justly so because of the lack of sufficient instruction and to point out the fact that no responsibility can be placed on the man who has not been given definite information as to just what he is to do. A man has just as much opportunity to display his individualism doing the same work well, over and over again, as he has in doing work that varies and that requires infinite patience and laborious effort.

Besides, such work is not suitable to the American temperament. It is doubtful whether there are enough skilled mechanics in all trades in the United States to man one good-sized industrial city if production were organized on the scheme that every man is to do all phases of the work. The writer has visited many factories and can hardly recall one which contains more than a few skilled all-around mechanics. These men hold the position of master mechanic or foreman of the maintenance gang and are usually of foreign birth.

### *Economics of Standardization*

This brings us to a discussion of the economic aspects of standardization. If we were to depend on the skilled, all-around man to do our work, we would never get it done. A hundred men acting as specialists, each doing his own particular class of work, can turn out at least twice as much as a hundred men, no matter how skilled, who are doing all the work from start to finish. If we were to depend on labor to furnish us with the necessities of life we would never get them for the simple reason that there is not enough labor here to turn out all the needed products by hand.

Therefore, it is necessary to employ large machines, as substitute for labor. Wherever large machines are employed it is necessary to standardize production, standardize the machines, and standardize the materials. Living conditions are such in the United States that as individuals we consume much more than we produce with our own hands. This difference between production and consumption is made up by saving brought about by the employment of machines and by standardization. No one would think that the purchaser of a Ford automobile is indulging in a luxury, yet a Ford would be a distinct luxury in Europe, even in normal times.

Standardization has a leveling influence. It makes it possible for people to use commodities that they would never be able to have under other circumstances. At the same time it raises the quality of the product to a point where the greatest number of people can use it and get satisfaction from its conconsumption.

There is also a curious idea existing that standards and standardization tend to restrict invention since a product once standardized cannot be changed without a great deal of cost and trouble. The actual effect is the very opposite of this. Standardization serves to focus the work and make invention much easier since the various demands of industry become specific. It is possible to tell an engineer or professional inventor exactly what is wanted so that he can proceed to work with a minimum of effort. Under the old method he would have to try everything in the hope of landing by chance on some product that is in demand.

### *Standardization of Material*

There is probably no other industry where such a variety and apparent confusion of raw material exists. Careful classification and standardization of the uses of the various materials is therefore all the more desirable. The latex can be drawn from trees growing all over the world in the tropical zone. There are endless grades and subdivisions available on the market and in actual use. In addition, innumerable ingredients are used to get the gum into the desired state and these, too, cause much confusion and difficulty. As if this were not enough, rubber manufacturers often substitute artificial names for the customary names of rubbers that are shipped to them. The purpose of this substitution is to confuse any bystander who may come in contact accidently with their compounding process and thereby discover a secret that is always sacred among all rubber men.

Crude rubbers coming to the factory should be reduced to the lowest number possible consistent with safety. With the vast increase in the production of plantation rubbers and the consequent stabilization of the quality of the products this should become less and less difficult. Pearson in his book on *Crude Rubber* seems to think that the plantation rubber is rapidly approaching a point where it will equal the wild rubber in every way. He says in part:

"The cleanliness of plantation as compared with forest rubber has been an attraction from the beginning, and the higher prices paid by the farmer has been due to its greater

contents bulk for bulk, of rubber. Originally it proved deficient in strength as compared with the Brazilian product. For some purposes the deficiency of nerve of the new rubber should not prove a disadvantage, as, for instance, in solution making, in which it has been largely used. Gradually, however, it has replaced Para in practically every use to which the wild gum is put."

As a matter of fact the price of plantation rubber has dropped so low that it is practical to use plantation rubber for all the ordinary purposes of rubber product manufacture. The indications are that when the price finally recovers from the effect of the present depression plantation rubber will still be low enough to warrant its constant use.

In classifying the stores it is best to use the Dewey decimal system prefixed by some identification symbol which will connect the number with the material. Stores may be divided into raw materials, supplies, and finished stock. The raw materials and supplies may be kept in one storeroom. The finished stock will necessarily have to be kept at the other end of the building. To demonstrate the use of this method a list of raw materials with their identification numbers is given below. This list makes no claim of being accurate or sufficient for the use of even one organization. It is simply selected at random, illustrating the decimal system of identification together with the symbol. The number of each raw material is preceded by the letter M to distinguish it from supplies. The second letter in the symbol is the general classification of that particular type of material. For example, any crude rubber number would be preceded by the symbol MR. The Dewey classification of raw materials, together with their symbols, follows:

MR00 — Rubber
MA100 — Accelerators
MF200 — Fillers
MR300 — Resin
MC400 — Colors
MA500 — Acid
MO600 — Oil
MF700 — Solvents
MF800 — Fabric

These in turn are subdivided under their special numbers. This subdivision follows:

PLANTATION HEVEA

MR01 — First Latex crape
MR02 — All Latex crape
MR03 — Amber crape No. 1
MR04 — Amber crape No. 2
MR05 — Amber crape No. 3
MR06 — Brown crape, thick and thin
MR07 — Brown crape seconds
MR08 — Brown crape rolled
MR09 — Smoke sheet drip
MR010 — Smoke sheet plain

PARA

MR21 — Up river fine
MR22 — Up river medium
MR23 — Up river coarse
MR24 — Islands fine
MR25 — Islands medium
MR26n — Islands coarse

The other essential raw materials can be treated in exactly the same way. In addition standards must be set up for the materials by which they can be tested from the time they are received until they are turned into the finished product. Inspection at the very beginning will save a lot of trouble and will anticipate mixing in costly ingredients with defective material.

### *Standardization of Products*

The first step in the standardization of the product is the complete classification of its various parts. As a good many rubber parts are produced by continuous process, this should not be very difficult. Yet it is amazing how little information of this sort is available even in the bigger rubber factories. In order to illustrate the break-down of various products to their component parts, we will assume that this factory restricts production of the units that are actually sold to tires, tubes, hose, belts, soles and heels. These in turn are subclassified under the mnemonic Dewey system specified above into the various grades or classes. For example, the tire classification would run something like this: Auto tires, truck tires, bicycle tires, airplane tires, solid tires and carriage tires. The inner tubes would be sub-classified into: Auto tubes, truck tubes, airplane tubes, bicycle tubes, and so on. Automobile tires would be subdivided into fabrics and cords by sizes.

The major classifications have now been made. The next step is to break down the tire into its component parts and to repeat this operation with all the other products of the factory. We will examine the specification sheets of a 34 x 4 straight drag cord tire. This tire is cured by the combination process. The master specification sheet will call for two items by the specification number—namely, the tire carcass and the tire tread, both of which have gone through a preliminary cure. The tire tread is a complete unit and therefore has no other components. The second sheet shows the break down of the tire carcass. In order to demonstrate this point we will take a standard tire that has the greatest number of parts possible. The break down of the carcass would show the following components referred to by name and by specification number:

Under-tread, breaker, side wall, second chafing strip, first chafing strip, flipper or bead strip, wire insulation, fabric wrap, filler, fabric plies, 8 plies 11/32 in. thick, cord fabric, auto tire compound.

Probably no other material presents the opportunity for so many errors in inspection as rubber. The writer made the experiment once of having sixteen different inspectors test the same piece of side wall for gage. Out of sixteen attempts we received twelve different gages for the same piece of side wall. Furthermore, there is probably no other industry where the gang boss and the worker are left to their own devices as much as in this work with respect to tests to be applied to the finished product of each department in order to determine whether the written specifications have been met.

Specifications in a rubber plant, as a rule, are nothing more than the paper figures that must be aimed at. I have even known plies of friction that were passed as of a certain gage to be cut down on secondary inspection to the width required by a narrower gage, simply because the first inspection was not accurate. It is no new thing in a gum shop to have the calender man run side walls three plies instead of four, to get the required gage, or vice versa. To be sure, rubber is a very difficult material to handle and is subject to all sorts of atmospheric and physical changes that do not exist, or exist only in part with other materials. But the only hope for stable production is to concentrate on a few products and then to standardize the various measurements and tests from the compound room on.

### *Standardization of Machinery*

In standardizing machinery the first essential is to decide upon a type that will yield a uniform product. This is especially difficult in rubber working machinery because rubber machines of various sorts are still crude in their development. This crudeness is due entirely to the fact that the designers of machinery have not broken away completely from the influence of metal working and wood working principles in many of the machines, especially those used in the preparation of the rubber for the final manufacturing processes. Furthermore, rubber manufacturers are usually in a quandry because there are so many types of machines offered on the market that it is difficult to determine which will do the work required.

However, having selected the machines, in each case, it is necessary to make out detailed specifications with the peculiar qualities of the machines in mind so that no machine will be required to do something that it cannot and no unnecessary friction in planning and production will be created. These specifications or instructions should be made out in great detail and the supervisory force must be instructed to see that they are faithfully carried out.

Once specifications are made, it is very essential that the

machines are periodically inspected for maintaining the production up to standard specifications. This periodical inspection is often referred to as anticipatory inspection, and it is really amazing how much of delay and inefficiency can be eliminated by periodic inspection of machines instead of waiting until the breakdown actually occurs and then making the necessary repairs.

An illustration of the procedure in standardizing equipment may be made by the selection of mills and mixers. The first consideration there would be the relation of the face of the mill and its consequent diameter to the work required. If the plan indicated in the article on "Location and Layout" is followed out, then mills can be selected for each product in accordance with the special characteristics of that product. Where hard, tough rubbers are used or where the mixing has to be very thorough, a heavy duty mill can be installed. A mill with an 84 in. face and a 24 in. diameter would be considered fit for heavy duty, although some mills are made with an even larger face. For the lighter work, the 60 in. face and the 20 in. diameter can be used. While warming mills are probably selected of the 48 in. face and 18 in. diameter type.

Having agreed upon the type of rolls to use the next step is to decide on the gearing. This is a problem of utmost importance since the production is seriously affected by the speed with which the mill is run. The ideal, of course, is to have the mill run at the highest speed possible. The question of burning the rubber and wearing out the mill are the chief considerations. However, developing an efficient working ratio should give the engineer no difficulty.

There are other problems connected with the type of bed selection and the particular method by which power is transmitted to the machine. If there is enough work to warrant the use of a whole line of mills a single shaft may do all the work of transmission. Where only a warming mill is required, however, a special motor attachment is preferable because it gives accurate data and enables the manufacturer to determine exactly where man power becomes cheaper than horse power.

### *Standardization of Methods*

It is in the standardization of methods of work that the manufacturer is entirely responsible because here all the factors are within his own control. Kind and quality of material may depend on the market and on the style. The product depends largely on demand and upon decisions of such bodies as the Society of Automobile Engineers. The methods are entirely in the hands of the manufacturer himself.

The chief avenues of standardization of methods are through time and motion studies made famous by Taylor and perfected by Gilbreth. These methods require that detailed study shall be made of the motions on all labor operations and that once these studies are made the workers must be trained to follow them out without a single deviation, except by special permission from the shop foreman.

The time and motion studies in themselves avail nothing if the method of procedure in manufacturing is not standardized. I make special reference to the supply of material to the machines and to the removing of the finished products after the operations have been performed, as well as to the prompt reporting of any delay or deviation from the schedules. Controlling the movement of the material is so important, especially in rubber factories, where many factors enter in such as age, weather conditions, and a multiplicity of products that look very much alike and are hard to distinguish apart, unless properly stored, that the writer has been forced on various occasions to make out detailed instructions even for the truckmen who carry the stock. Below is an extract from one of his reports which will show the detail into which it was necessary to go in order to standardize the procedure for this work.

### *The Handling of Batched Stock*

(1) Batched gum stock comes into the storeroom from the mill room on batch trucks. The empty trucks must be weighed before going to the mill. The scale man fills out the small pin tag showing the truck number and the tare weight of the truck. The empty truck then goes to the mill to be loaded.

(2) When the truck has been loaded it is taken to the scales to be weighed. Every truck that goes into the storeroom must be weighed and have a batch stock move order made out for it. This batch stock move order is put up in quadruplicate copy, the first three copies having carbonized backs. It is serially numbered and a record of all books issued to the scale man is kept on a tally sheet by the record clerk in the control office.

(3) The scale man fills in the blank with compound numbers, date milled, stock number, gross weight, tare weight, net weight, weigher's number, and trucker's number. Then he detaches the quadruplicate copy which is made of cardboard and so punched that it may be hung on a hook provided for it on the truck. This tag is attached by the trucker. The weigher releases the truck after giving the other three copies of the move order to the trucker.

(4) The trucker delivers the truck to the stock room designated on the move order. Here the stock room inspector assigns the truck to a definite location which he indicates on all copies of the move order. Then he signs the move order on the line provided for that purpose and fills in the blanks, "Stock Room" and "Shift." He returns the duplicate to the trucker. *This signed copy of the move order becomes the basis for the truckers' pay.*

### *Standardization of Costs*

The only scientific barometer of business and production efficiency is the cost of the product. The unit cost serves the same purpose in a rubber factory that the pulse does in the practice of medicine. A surgeon may perform a major operation which carries with it grave danger of general infection. The only indication that the doctors have as to whether conditions are normal or not is by taking the patient's pulse and temperature constantly. If the pulse is irregular something is wrong. Similarly, if the unit cost rises above the fixed standard something is wrong and must be looked into at once so that the specific remedies required must be administered.

This end can be accomplished only by the systematic standardization of unit costs. This is brought about through an analysis of the cost covering at least a year of operation and then a careful apportionment of this cost to each department and then in turn to each machine, on whatever basis is most suitable for that department.

The nature of rubber manufacturing is such that arbitrary rules cannot be laid down for the methods of arriving at unit costs, especially with reference to the application of the shop burden, or indirect expense. Rubber manufacturing is a continuous process in some departments, a straight manufacturing process in other departments, and in still others either a combination of the two or else both processes running simultaneously. Consequently, the method of arriving at the cost demands careful study for each case.

The cost analysis is brought about through a system of expense orders by which each class of expense is assigned an order number so that all work or material purchased in connection with this class of expense may be charged to this order number and the cost thus automatically collected. The various methods by which cost can be collected and applied will be discussed in the chapter on cost, but this much must be remembered, that no true index of production efficiency can be obtained unless systematic standardized methods exist for finding the cost, because in the final analysis it is only the increase or the decrease of the cost per unit that is the true indication of increased or decreased efficiency.

### *Conclusion*

The biggest factor in scientific management is standardization. That is the reason why this movement has made such progress in such a short time here. We are organizers and we run to mass production. In order to produce great quantities on an efficient basis it is important and absolutely necessary to standardize the individual unit. In order to standardize the unit the materials, the machines, and the methods must also be standardized.

# ABSTRACTS

**Technical — General — Commercial**

### Compounding Rubber with Pigments

In the mixing of the pigment with rubber in the compounding process, a good deal of the pigment is always dispersed through the air. The process, which is patented in United States Patent No. 1,405,439 by the Goodyear's Metallic Rubber Shoe Co., does away with this difficulty, shortens the mixing operation and provides a pigment mixture which will produce desired characteristics in the rubber product without impairing the quality of the product. When the pigment is added to the mixing rolls in the powder form, the tendency for it to be scattered through the air and discolor other rubber stocks which may be undergoing treatment near-by is very great. The use of a binder to prevent this from happening cannot always be resorted to with impunity, for the binder may often confer undesirable properties on the rubber.

The process, patented as above, is primarily concerned with the use of lampblack as the pigment. The pigment is first mixed with tar and then the mixture is used to color the rubber. A weighed quantity of the black is put into a kneading or mixing machine with about one quarter of its weight in liquid tar. Then sufficient naphtha or other solvent is added to moisten the entire mass. The mixing results in the even distribution of the tar throughout the mass of lampblack. After the mixing is complete, steam is admitted to the mixer and the naphtha is distilled off, and recovered in a condenser for further use. The product that is obtained is in the form of granular pellets. It may be used directly in the rubber rolls.

### Hollow Rubber Articles

United States Patent No. 1,401,567 is concerned with a process of manufacturing hollow rubber articles. This invention consists of the use of cores which may be previously formed, preferably by casting, and composed of a material adapted to fuse below the usual vulcanizing temperature whereby an internal pressure may be created and applied to the article, equally in all directions, consequent upon the application of heat for vulcanization. The process is particularly applicable to the manufacture of inner tubes for tires and for pneumatic tire casings. Two co-acting mold cavities are used, each having an annular cavity which is adapted to receive one half of a tire casing. The mold members are preferably rabetted together and may be held by any suitable means. A tire casing is then built over a core of metal or metal alloy or composition. The core remains within the casing when the casing is placed in the mold and when the vulcanizing temperature is reached the core melts and expands exerting great force on the rubber, forcing it equally outward in all directions against the exterior mold. The core may be removed in its fluid condition by allowing it to flow out of the casing, preferably before removing the casing from the mold. In order to hasten the melting of the core and insure the vulcanizing heat being applied equally well to the interior and exterior of the casing, there may be provided a passage extending around the core through which the heating fluid, steam, may be passed. In order to avoid using a solid mass of a fusible metal, the inner part of the core may be made from a metal which is infusible at the vulcanizing temperature. The core in this case is made in sections to enable its removal from the mold. The fusible metallic alloy contains lead, tin, bismuth and cadmium. A composition, containing 58 per cent of lead and 42 per cent of cadmium fuses sufficiently below the vulcanization temperature to secure satisfactory results. Another efficient composition contains 50 per cent of bismuth, 25 per cent of lead, 12.5 per cent of tin and 12.5 per cent of cadmium. This composition fuses at a temperature between 60 and 70 degrees C.

### Deresinification and Purification of Balata

Crude balata is mixed with a considerable proportion of resin and it is also contaminated with earthy substances, fragments of bark, etc., which render it unsuitable for use until it is first purified. The process, which is patented in United States Patent No. 1,406,654, which is assigned to the Revere Rubber Co., is concerned with a process of purifying balata by means of a suitable solvent, so as to produce a cheap product under favorable operating conditions. The extraction is carried out in a barrel churn. The barrel is arranged in such manner that it can be rotated. The supply of solvent, which in this case is gasoline, passes through the hollow bearing. A manhole is provided for introducing and removing the balata rubber. There is also a suitable valve for removing the resin-laden solvent. The solvent is then recovered by distillation. The material, that is treated in this churn, is removed after the extraction is completed and is placed in a vertical churn, which is heated by a steam jacket and which is provided with a vertical stirring arrangement. Redistilled solvent is added and the balata rubber is made to dissolve therein by heating. The solution of balata is then transported to a storage tank, which is provided with a steam coil in the bottom, so that the solution may be kept in a heated condition. The dissolved balata is then fed to centrifugals and from the centrifugals it is sent to the cooling tanks where the balata is redeposited from solution. The redeposited rubber is placed in another set of centrifugals, which remove a considerable part of the entrapped gasoline. The rubber is then worked between hollow, steam heated rolls. The final operation consists in allowing the material to dry for a period of about eight hours.

### Rubber Insulating Composition

In making telegraph cables it is essential to see that the materials used in the construction will not have too great an effect on the speed of signals sent through the wires. This speed varies directly as the specific inductive capacity of the dielectric which covers the conductor. The best results are obtained when gutta-percha or rubber compositions are used, as they possess the necessary dielectric properties. However, when rubber is used it is essential that materials in the nature of fillers be added so that a structure capable of withstanding mechanical stress encountered may be available. Many mixtures have been compounded with this view in mind but they have always possessed a materially higher specific inductive capacity than that possessed by rubber alone. In United States Patent No. 1,415,076, which is assigned to the Western Electric Co., there is described a composition which contains rubber and various fillers and which has all the desired properties of low specific inductive capacity, high mechanical strength and cheapness.

Fused quartz is the material that has been found to be most advantageous for this purpose. The fused material is finely ground before it is incorporated with the rubber. Sulphur may be added or not, and the mass may be formed into the desired forms with or without vulcanization. The heat treatment of the quartz in the electric furnace results in the production of an amorphous substance, which possesses practically all the properties of the original crystalline quartz, but has a much lower specific inductive capacity.

### New Artificial Rubber

A new artificial rubber, which has just been patented, contains 2.25 pounds of glycerine, 5.625 pounds of gelatine, 9 pounds of water, 2.25 ounces of tannic acid and 4 ounces of formaldehyde.

# The Reworking of Old Rubber

By Ismar Ginsberg, B.S., Ch.E.

THE reworking of old rubber is an important branch of rubber manufacture. It is always profitable to the rubber maker, less so at times when the raw rubber market is weak and more so when the market is strong and crude rubber commands a high price. In order to carry out this regeneration economically and with good results, it is necessary that the process of working up old rubber articles, such as tires, soles and heels of shoes, etc., etc., be easy to operate, that it require the use of simple, cheap chemicals only and that it produce a rubber of fairly good quality while not injuring the other recoverable products of value that may be mixed with the rubber in the vulcanized ware. In the past few years considerable progress has been made in the technology of this branch of rubber manufacture, and the following review gives the various processes that have been developed within the last few years particularly those which have achieved success. Only the high spots are touched, as the number of methods of regenerating rubber is very large; consequently only those processes of real commercial value are described.

### *Vacuum Heat Process*

This process was perfected in the Dutch Indies and is patented in all the principal countries of the world. (see German patent no. 302,995; French patent no. 489,230 and English patent no. 133,369). The vulcanized rubber, either soft rubber, ebonite, etc., is worked up and regenerated without the necessity of melting the same. This is accomplished by placing the rubber in an autoclave and either exhausting the air and conducting the operation in a vacuum, or else heating the rubber highly in the presence of inert gases. The injurious action of air on rubber, when heated to such a high temperature, is avoided by cooling the treated rubber quickly with cold water or with a solution of soda or else with the aid of cold stones. In some cases it is also advisable to subject the rubber mass to a drying process, which should be conducted in a vacuum. The regenerated rubber, that is obtained by this process, can then be worked up in the usual manner in the mixing rolls and formed into articles in molds just like crude rubber. It is added preferably in certain definite proportions to the raw rubber compound.

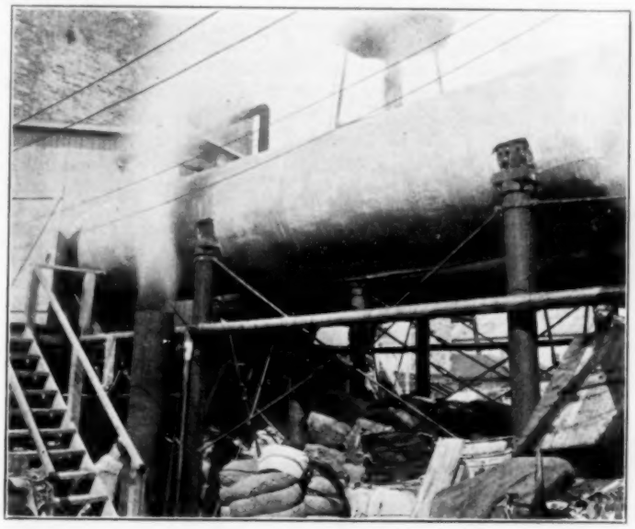
### *Pressure Heat Process*

This process, which works on an opposite principle to the one just described, is of German origin and is patented and operated in Germany. (see German patent no. 313,554). Old rubber and rubber waste are treated in this process by being subjected in admixture with water or caustic liquors to high temperatures, somewhat in the neighborhood of 210 degrees C, and to high pressures, from 200 to 600 atmospheres. This treatment results in the removal not only of the sulphur which is in the free condition in the vulcanized rubber, but also of the sulphur that is combined with the rubber. The sulphur is completely eliminated, as are also the various organic and inorganic fillers that may be used in the compounding of the rubber. After the process has lasted for some time, part of the rubber dissolves in the regenerating fluid and part remains as a soft spongy mass. At the conclusion of the pressure heating process, the regenerated rubber mass is cooled, and that part of the rubber which was in solution, separates out in colloidal form.

The process is carried out in an autoclave which is packed very tightly so as to be fast to pressure. The process can be conducted in a continuous manner by providing the pressure digester with a worm feed for the introduction of the rubber that is to be regenerated. At the end of the worm feed, it has been found advantageous to fasten a nozzle, so that the rubber on entering the autoclave will be distributed as uniformly as possible. The bottom of the pressure digester is provided with an opening which is controlled by a valve. The high pressure within the regenerating chamber forces the regenerated rubber to exude from this opening. The process is easily carried out and presents no technical difficulties in its operation.

### *The Amine Catalytic Process*

A process, which works on an entirely different principle, is patented by the Xylos Rubber Company, Ltd., in German Patent No. 320,016. The aim of this process is to recover the rubber in such a condition that it will possess nearly all the properties of crude rubber, so that it can be used in the place of the latter in the manufacture of different rubber articles. Furthermore this process aims to remove all foreign impurities completely, in particular the fibrous materials that are mixed with the old rubber, as in the case of the regeneration of the rubber in rubber tires, belts, etc. The process is especially well-suited for working up these old tires.



A Giant Devulcanizer at a Reclaimed Rubber Plant

The process is carried out with the aid of substances which appear to exert a catalytic influence on the devulcanization of the rubber. The usual devulcanizing agents are used, that is materials, such as the caustic alkalies which have the power of absorbing the sulphur, which is contained in the rubber both in the combined and uncombined condition. The alkalies are dissolved in water and the old rubber is subjected to the action of these alkaline solutions in an autoclave under considerable pressure and at a temperature of 175 degrees C. Mixed with the alkaline solution, there is a quantity of the aforementioned aromatic amines. This quantity must not exceed 5 per cent by weight of the waste rubber mass. The amines used are aniline, toluidine, xylidine, etc. The rubber is allowed to remain in the autoclave under the above conditions for about five to six hours.

It is strange that these aromatic amines, which are well-known for their action in the acceleration of the vulcanization of rubber should have a corresponding effect in the devulcanization of rubber. After the reaction is over, the amines may be detected in their original condition in the mass. This forms an additional substantiation of the claim that the amines act as catalysts in the process of regenerating the rubber. The fibrous materials, mixed with the rubber in the tire, are loosened effectively, so that they can be easily removed. The plastic mass of rubber that is recovered can be worked up further between the mixing rolls and formed into sheets or else molded into various articles.

*Warm Water Process*

This process is for the purpose of removing the fibrous materials from vulcanized rubber, and from its appearance it is very much simpler than the process which we have just discussed. However, it does not seem probable that the process can produce any satisfactory results, except when the fibers are very loosely held by the rubber. This process is also patented in Germany, (see German Patent No. 303,171.). It consists simply in agitating the refuse rubber with water which has been heated slightly. After a short time the rubbery mass rises to the surface and the fibers sink to the bottom of the apparatus. Separation of the two is then very easily accomplished. The simplicity of the process is attractive and it is unfortunate that further details regarding the same were unavailable. Whether it will work properly, as is claimed for it, is another story.

*Saponin Treatment Process*

This process, which is patented in Austria, (see Austrian Patent No. 78,780) is based on repeated alternate alkali treatments and tumefication or swelling, produced by saponin mixed with other chemicals. The vulcanized rubber waste is first treated with aqueous solutions of the caustic alkalies. Then, it is dried in a vacuum. The next step is to subject it to tumefication. This is accomplished by treating the material with sassafras oil or any other substance which contains the proper proportion of saponin. Then the product is subjected to the action of carbon disulphide or the halogen substitution products of ethylene or the hydrocarbons that are obtained by the pyrogenxous decomposition of petroleum. This treatment lasts for several hours, and the temperature is raised gradually during the course of the same until it reaches the boiling point of the particular solvent that is used. The extraction process is interrupted repeatedly and the rubber is taken out of the extraction vessel and placed in a solution of caustic alkali and the alkali treatment is then repeated. The rubber extracts which contain considerable quantities of rubber are then processed in order to recover the rubber therefrom. This is accomplished in the usual manner by the addition of water or alcohol, or else the solvents are distilled off.

For example, the rubber article, such as old rubber tires, is treated with a 15 per cent solution of caustic soda in an autoclave under 20 atmospheres pressure for a period of three hours. Then the caustic soda solution is drawn off and the rubber is dried for two hours in a vacuum apparatus. It is then subjected to a one hour tumefication with the aid of a liquid mixture consisting of equal parts of trichlor-etylene and the above-mentioned petroleum derivatives. The extraction process takes 6 hours and this is followed by a three hours alkali treatment and an one hour tumefication. The final yield of rubber amounts to 61 per cent of the total waste rubber product. Each stage in the extraction process can be discontinued temporarly in order to remove the resinous substances that separate out in the solution. This is done by the aid of acetone.

*Metallic Sodium Aniline Process*

As has been seen above, the effect of aniline on rubber, that is its devulcanizing effect, has been recognized and processes have been patented, taking advantage of this property of aniline. Another process, based on this action of aniline, is patented in British Patent No. 126,397 and French Patent No. 494,757. The action of aniline in devulcanizing rubber lies in its power of decomposing the sulphur-rubber molecule. The rubber, that is treated in this process, is first freed of its uncombined sulphur content in the usual manner. Then it is immersed in a solution of aniline in which there has been mixed a certain proportion of metallic sodium or potassium. The solution is heated for several hours. Then the aniline is removed by distillation or decantation and the resulting product is washed and purified. This process may be carried out by dissolving the rubber in xylol with the addition of caustic alkali which is absolutely free from water. In each case the presence of sodium or its compounds is for the purpose of combining with the liberated sulphur.

*Straight Alkali Process*

In this process the rubber is treated with cold concentrated solutions of the alkalies, such as the caustic alkalies, alkali carbonates and bicarbonates. The rubber, mixed with this solution, is placed in an autoclave and subjected to the action of heat and pressure. After the treatment has been continued for the proper length of time, the contents of the pressure digester are cooled and then washed with water and finally with a little hydrochloric acid solution. This process is patented in British Patent No. 158,783 and in French Patent No. 529,758.

*Linseed Oil Process*

This process is not one in which a devulcanized rubber is obtained, but in which the final product is a plastic mass, that has been made from vulcanized rubber waste and that has many uses. The process is of Dutch origin and is patented in British Patent No. 122,188. The rubber waste is first ground up finely and the powder is mixed mechanically with vigorous agitation with as little oil as possible. For this purpose linseed oil is used or any other oil which will react with the sulphur that is present in the rubber. The temperature is raised to 150 degrees C and reaction begins to take place. Then more sulphur is added and the temperature is raised to 160-170 degrees C. The process is continued until a solid mass is obtained which can be worked between the rolls.

*Kneading Process*

This process is entirely mechanical as no chemical reagents are used. It is claimed that it will give very satisfactory results, as good as those that are obtained by the various processes in which chemicals are used. The rubber that is treated in this manner should be free or nearly free from all binding agents. The kneading operation is conducted at a temperature below the melting point of the sulphur in the rubber. This operation is continued so long until the pieces of old rubber are worked up into a single mass, which is plastic enough to hold together under the action of the mixing rolls. The mass is then passed through pressure rolls about 20 times. This serves to agglomerate the mass further, so that its consistency is improved and the attraction between the different particles is increased. This prevents the individual particles from separating out from the mass. During this operation it is advisable to cool the rolls, so that the temperature is kept as far as possible below the melting point of the rubber. The friction, which is produced during the pressure mixing operation, causes a rise in temperature, and if care is not taken to keep this temperature down below the melting point of sulphur, bad results are obtained. The rubber undergoes a devulcanization and when it reaches the pressure rolls it is already in a state, capable of being revulcanized. This is another reason why it is advisable to control the temperature carefully, as if the latter reaches a high enough point, the rubber will be vulcanized again, which is not at all desirable. After the rubber has gone through this treatment, it is ready to be mixed with crude rubber to be molded into various shapes or else it can be used alone, without the addition of any new rubber. The care with which the process is carried out determines the quality of the finished product, and if the process has been conducted properly, a product is obtained, which it is claimed, is just as good in every respect as raw rubber. The temperature in the process must not go above 50 degrees C, and the speed of the mixing rolls must not exceed 14 meters per minutes peripheral speed. At the start of the operation the speed is kept down to 10 meters per minute. The process is patented in Austrian Patent No. 80,842 and French Patent No. 518,120.

*Molecular Disintegration Process*

The process, that is described in French Patent No. 528,182, is also a mechanical process, wherein the old rubber is treated by mechanical means only. No chemical is used. The process depends on the alleged fact that when rubber, that is old rubber, is ground up very finely, so that it attains the state of a fine impalpable powder, this material becomes revulcanizable. The molecular disintegration, it is claimed, produces

*(Continued on page 355)*

# Tire Prices Now at Lowest Point in Their History

THE accompanying chart shows in a graphic manner the course of consumer prices of both fabric and cord tires from 1913 and 1914, respectively, the latter being the year in which the manufacture of cord tires on a large scale began. The solid line on the chart indicates that the previous "low" for fabric tires was about $14, reached in February 1915, and the dotted line shows the "low" for cord tires was about $27, reached at the same time.

For comparison, note the present average price of fabric tires at around $10 and of cord tires at around $15. This represents the culmination of a steady decline from the peak price in January 1919 of $23.50 for fabrics and $41.50 for cords. The question is, will the decline go much further, with tire manufacturers inclined to lower rather than to advance prices, or will certain factors in the situation, such as labor conditions, the advance in cotton, the possible advance in crude rubber, chemicals, etc, call a halt?

Although automobile tires and tubes are now offered to the user at the lowest prices in their history, there seems to be a question in the minds of many who have studied the situation whether cheapness of price will so stimulate the demand for casings and tubes as to bring about the permanent increase in business desired. Some manufacturers and dealers believe that it will; others continue to talk quality and the deterrent factors referred to, and predict a return to higher price levels and what they term "safe and sane" conditions. Nearly everyone admits that the situation is an abnormal one, but no one seems to know what the solution of the price problem is to be and when it is to come.

According to some in the trade, the manufacturers themselves are responsible because the quality of their tires has been maintained or bettered while prices have been declining. On the other hand, it is admitted that the price may get so low that there is no profit left for either maker or dealer, and then quality begins to suffer.

The following table of prices on Goodyear and Goodrich fabric and cord casings, from April 1913 to August 1922, has been compiled by Dow, Jones & Co., New York, from the latest consumers' price lists of these manufacturers:

| | Goodyear | | Goodrich | |
|---|---|---|---|---|
| | 30x3½. | 34x4½. | 30x3½. | 34x4½. |
| Present price— | | | | |
| Fabric | $10.65 | $30.80 | $10.95 | *..... |
| Cord | 14.65 | 39.50 | 15.95 | $39.50 |
| November, 1921— | | | | |
| Fabric | 14.75 | 36.25 | 13.75 | 35.65 |
| Cord | 18.00 | 43.90 | 18.00 | 43.90 |
| May, 1921— | | | | |
| Fabric | 17.50 | 40.30 | 16.00 | 38.05 |
| Cord | 24.50 | 54.90 | 24.50 | 49.65 |
| November, 1920— | | | | |
| Fabric | 20.00 | 47.95 | 20.00 | 47.95 |
| Cord | 31.15 | 62.05 | 31.15 | 62.05 |
| March, 1920— | | | | |
| Fabric | 23.50 | 53.25 | 23.20 | 53.15 |
| Cord | 31.15 | 67.05 | 31.15 | 67.05 |
| July, 1919— | | | | |
| Fabric | 23.35 | 45.25 | 18.70 | 42.75 |
| Cord | 26.45 | 57.00 | 26.00 | 55.80 |
| May, 1919— | | | | |
| Fabric | 20.00 | 45.25 | 18.70 | 42.75 |
| Cord | 26.45 | 57.00 | 26.00 | 55.80 |
| January, 1919— | | | | |
| Fabric | 23 50 | 53.25 | 20.65 | 46 60 |
| Cord | 41.65 | 67.05 | *..... | 62.25 |
| January, 1918— | | | | |
| Fabric | 21.35 | 48.40 | 15.10 | 34.15 |
| Cord | 37.85 | 60.95 | *..... | 62.25 |
| January, 1917— | | | | |
| Fabric | 17.95 | 40.00 | 14.70 | 31.20 |
| Cord | 32.75 | 52.75 | *..... | 49.25 |
| January, 1916— | | | | |
| Fabric | 15.60 | 38.40 | 13.40 | 30.05 |
| Cord | 28.50 | 49.95 | *..... | 44.90 |

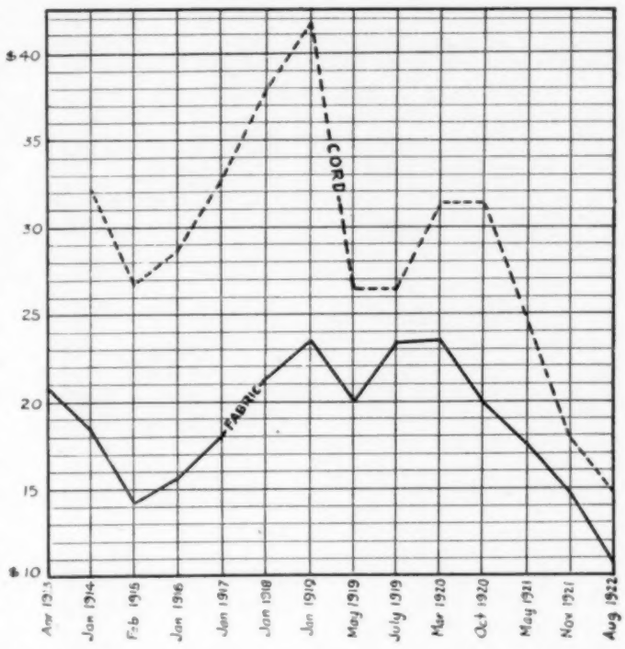



CHART SHOWING THE COURSE OF AUTOMOBILE TIRE PRICES FROM APRIL 1913 TO AUGUST 1922

| | | | | |
|---|---|---|---|---|
| February, 1915— | | | | |
| Fabric | 14.20 | 31.65 | 12.50 | 27.30 |
| Cord | 26.90 | 43.40 | *..... | 38.95 |
| January, 1914— | | | | |
| Fabric | 18.40 | 38.60 | 17.00 | 39.35 |
| Cord | 32.25 | 52.90 | *..... | 46.20 |
| April, 1913— | | | | |
| Fabric | 20.75 | 43.40 | 19.60 | 40.25 |

* Not manufactured.

## The Reworking of Old Rubber

*(Continued from page 354)*

this effect. The process consists in grinding up the rubber in a specially designed mill, so that it can be secured in a condition of molecular fineness. The powder is then screened and then mixed with water and subjected to a decantation process. The extremely fine powder that is obtained in this way has plastic properties and can be vulcanized. This substance is mixed with just a little new rubber and is excellent for waterproofing fabrics and for the manufacture of hard rubber and ebonite.

### *Miscellaneous Processes*

An extraction method of reworking old rubber is described in British Patent No. 126,397. In this process the rubber is subjected to the action of a mixture of aniline and xylol in the presence of caustic alkalies.

French Patent No. 478,280 also describes an extraction method, which is particularly well suited to the reworking of old worn-out rubber tires. The reagent used is ethane tetrachloride. This solvent dissolves the rubber very readily and loosens the fibrous matter, combined with it in the tire, so that it may be easily removed. The process is best carried out at an elevated temperature. This must not, however, reach the boiling point of the solution, 140 degrees C.

The Dunlop Rubber Company of England uses a very simple method of reworking old rubber. The vulcanized rubber is comminuted and placed in an autoclave. The air is exhausted as completely as possible and the rubber is then subjected to the action of heat. The temperature rises to 450 degrees C. This process is found in French Patent No. 493,604.

# World Trade in Rubber Balls and Toys

WHILE statistics showing the distribution of the trade in rubber toys are only available to a limited extent, their growing importance in world trade has recently led a few countries to publish import and export statistics of these articles as a separate item. In the manufacture of rubber sports goods the United Kingdom and the United States lead all other countries. Before the war Germany led in the manufacture of rubber toys, but Japan is now a close rival to Germany, while the United States, England, France, and Austria also do a considerable business in this line.

In 1920 (the only year for which British trade in these goods is available) only small quantities of golf, tennis, and other rubber balls were imported into the United Kingdom, the total value being £2,115, and the strength of the British industry in the manufacture of these goods is shown by the fact that the value of exports reached £350,000 in 1920. Of these exports the United States took £126,986; Australia, £40,857; Canada, £32,811; France, £28,750; South Africa, £17,889; Argentina, £16,027; the Netherlands, £13,486; and New Zealand, £11,591.

### *Golf and Tennis Balls*

Golf balls are imported into the United States through wholesalers and distributors in New York and Chicago, and the imported kind sell at about $1, while American makes, as a rule, are less expensive.

While the popularity of golf has increased considerably in the United States in the past decade, tennis has always been a popular game and leads golf as a producer of revenue for the sporting-goods dealers and manufacturers in this country. Tennis balls are exported from the United States in considerable quantities and occupy a more favorable position in foreign markets than do American golf balls.

### *German and Japanese Trade*

The United States and Great Britain are the leading manufacturers of tennis and golf balls and are beginning to manufacture rubber toy balls, but Germany is now making a strenuous effort to regain its hold on this branch of the trade, and according to unofficial sources has exported large quantities of toy balls.

One of the leading classes of products manufactured by the Japanese rubber industry is that described in official statistics as rubber toys and balls. Exports of these products from Japan in 1921 amounted to 1,248,621 yen (approximately $624,000). The largest manufacturers are the Mitatsuchi and the Kakuichi Gomu Kaishas, located at Toyko. The leading markets to which these goods were sent in 1921 were the United States, British India, Great Britain, Australia, Canada, China, Dutch East Indies, New Zealand, and South American countries.

### *British Imports of Rubber Toys*

Rubber-toy imports into the United Kingdom were first shown as a separate item in the trade reports for 1920. In that year the total value of the imports of rubber toys was £76,461. Japan supplied over 62 per cent of this trade, imports from that country totaling £47,443. Other sources were: The United States, £10,511; Austria and Hungary, £8,036; France, £5,945; and other countries, £4,526.

The official trade statistics published by the Peruvian Government show that, whereas the source of rubber toys of various kinds in 1913 were Germany, Belgium, and France, in 1919, Japan supplied 3,299 of the 3,623 kilos imported. The Peruvian market for rubber balls is also controlled by Japan, according to the figures for 1919, when about 87 per cent of the 3,757 kilos imported was secured from that country.

A small export business in rubber balls is done by Sweden. In 1913 its exports amounted to 12,760 kilos and in 1919 to 36,82 kilos, but in 1920, owing to the recovery of the German industry, the exports in this line declined to 26,186 kilos. These were sent to nearby European countries, the leading customers being Germany, Norway, Denmark, and the Netherlands.

While the statistics of other countries do not show the trade in rubber balls or toys specifically, the preceding paragraphs show that the aggregate world trade in these goods is large enough to warrant attention on the part of rubber manufacturers. There is also a good market for football and basket-ball bladders in most of the English-speaking countries, especially those in the Temperate Zones.

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## New Book Urges Universal Metric System

*WORLD METRIC STANDARDIZATION: AN URGENT ISSUE. A volume of testimony urging worldwide adoption of the metric units of weights and measures—meter, liter, gram. Compiled by Aubrey Drury, in collaboration with Clifton Hildebrand, W. Mortimer Crocker, Harry Allcock, M.I.E.E., and other members of the World Metric Standardization Council, 681 Market street, San Francisco, Cal., the publisher. 524 pages. Cloth, $5.00.*

ONE of the most interesting features about this book is the double-page insert map of the world in red at the beginning of the volume. It shows that in forty important nations the meter-liter-gram standards of measure and weight are the only legal units, and that in more than 200 countries the metric system is recognized by law and "used more than any other units," according to the caption under the map. In the United States, according to the caption writer, "metric units are used virtually exclusively in chemistry, physics, astronomy, seismology, botany, mineralogy and metallurgy. They are used exclusively in medicine. Coins are of metric weight and measure. The United States belongs to the World Postal Union, using metric units exclusively. They are used exclusively in the electrical industry, in photography, by jewelers; hundreds of manufacturing concerns employ meter-liter-gram. To be successful in metric countries, exporters use meter-liter-gram."

The introduction urges "that the units of weights and measures of the United States and of the British Commonwealths be brought into accord" with "the master standards of the world, the yard being advanced to the meter, the quart being advanced to the liter, and the pound to the 500-grams. This is the true 'standardization of standards,' for when this advance is achieved all the world will be upon the uniform metric basis."

The major part of the book is devoted to marshalling facts, figures, reports, statements and arguments from leading authorities of all countries in favor of adopting as a standard system of weights and measures throughout the world the meter-liter-gram units. It is claimed that 103,000 petitions have been sent to Congress pleading for the official adoption of the metric system in this country, and four state legislatures—Illinois, California, North Dakota and Tennessee—have asked the nation's lawmakers at Washington to adopt the system.

This volume impresses us as being a comprehensive and carefully compiled group of useful information, and as a handbook on the metric system it is invaluable. Yet at present it can only serve as propaganda until the United States and British governments feel that the time has come to join those other countries which use the metric system exclusively or largely. Offhand, we should say that its adoption by the rubber and tire industries would be a decided advantage, but such a forward step should be taken with official sanction and in conjunction with its adoption by allied industries.

# Official Tire and Tube Classifications Proposed

*To the Editor,* THE RUBBER AGE:

Our view of the present situation affecting the rubber trade in America is that the public is the chief sufferer; and we offer a thought, assuring you that we would be pleased to receive an expression from yourself as to whether or not you think the same feasible.

Our idea is that through the Rubber Association of America, or the United States Department of Commerce, Bureau of Standards, or some other constituted bureau of authority to which the rubber manufacturers might subscribe, automobile tire casings and inner tubes might be classified, bearing the seal of constituted authority as to each classification.

As a suggestion:

Class A—To conform to government specifications as to size, material, tensile strength, etc.

Class B—To grade a fixed percentage under Class A.

Class C—To grade lower than Class B.

Class D—N.F.C., seconds, etc.

The writer believes that the idea has some merit and, if adopted, would go a long way toward curing the existing evils of the tire trade, chief of which, to our mind, has been misrepresentation. This, once eliminated, would lead to the cure of other evils

Very truly yours,
THE LANCASTER TIRE & RUBBER COMPANY,
Columbus, Ohio

O. H. Williams, Vice President and General Manager

*Editor's Note:—There is no reason, so far as we are able to judge, why standard specifications and classifications should not be adopted and applied to automobile tire casings and inner tubes in precisely the same manner as they have been during recent years to Portland cement and other building materials specified by architects, to white flour and other foodstuffs, to drugs and chemicals as listed in the Pharmacopoeia, and to various other articles in every day use by millions of Americans. The plan outlined above, in our opinion, has decided merit and is worthy of study and investigation by the foremost tire experts in the United States. That a scale of government specifications and classifications, fixed by the Bureau of Standards in co-operation with the Rubber Association and the Rubber Division of the Department of Commerce, to which all casing and tube manufacturers would conform, would clear the situation and bring about healthier and better conditions for all concerned, is, we think, obvious to anyone familiar with the facts and not blinded by prejudice or partiality to any particular interest or policy.*

## Exports of Rubber Goods for June, 1922

EXPORTS of manufactured rubber goods from the United States to all countries for the month of June, 1922, amounted to $3,179,000, almost equal to the May figures of $3,236,000 and nearly twice the valuation of rubber exports for June, 1921. Manufactured rubber articles, including tire casings and inner tubes, were exported to the value of $31,000,000 during the fiscal year ending June 30, 1922, as against $60,000,000 for the previous fiscal year; but prices were about half of those prevailing in 1920-21, and thus the showing is about the same.

The Rubber Division of the Department of Commerce analyzes the export figures for June as follows:

(000 omitted.)

| | June | | Fiscal year ended June | |
|---|---|---|---|---|
| | 1921. | 1922. | 1921. | 1922. |
| Rubber (total)— | | | | |
| Value | $1,865 | $3,179 | $59,565 | $31,024 |
| Rub. reclaimed— | | | | |
| Pounds | 46 | 259 | 2,545 | 1,738 |
| Value | $6 | $23 | $422 | $182 |
| Rub. scrap— | | | | |
| Pounds | 421 | 778 | 7,273 | 8,849 |
| Value | $22 | $25 | $455 | $425 |
| Rub. footwear— | | | | |
| Boots, prs. | 10 | 25 | 198 | 236 |
| Value | $29 | $67 | $662 | $598 |
| Shoes, prs. | 88 | 69 | 6,038 | 1,376 |
| Value | $106 | $46 | $6,399 | $1,291 |
| Canvas shoes with rubber soles, prs. | ..... | 308 | ..... | 1,474 |
| Value | .... | $227 | ..... | $1,173 |
| Druggists' rubber sund's— | | | | |
| Pounds | .... | 67 | .... | .... |
| Value | $48 | $76 | $1,512 | $802 |
| Tires— | | | | |
| Pneumatic casings— | | | | |
| For autos— | | | | |
| Number | .... | 125 | ..... | ..... |
| Value | $758 | $1,626 | $28,308 | $15,673 |
| Pneu. tubes— | | | | |
| For autos— | | | | |
| Number | .... | 77 | ..... | ..... |
| Value | $60 | $152 | $3,214 | $1,491 |
| Tire repair mtl.— | | | | |
| Pounds | .... | 85 | ..... | 357 |
| Value | .... | $37 | ..... | $152 |
| Rub. belting— | | | | |
| Pounds | .... | 148 | ..... | ..... |
| Value | $118 | $82 | $3,018 | $1,013 |
| Rubber hose— | | | | |
| Pounds | .... | 331 | ..... | ..... |
| Value | $76 | $125 | $3,401 | $1,150 |
| Rub. packing— | | | | |
| Pounds | .... | 102 | ..... | ..... |
| Value | $35 | $39 | $1,305 | $515 |
| Rub. soles and heels— | | | | |
| Pounds | .... | 146 | ..... | ..... |
| Value | $30 | $59 | $858 | $490 |
| Rub. thread— | | | | |
| Pounds | .... | 89 | ..... | 506 |
| Value | .... | $112 | ..... | $605 |
| Oth. rub. mfs.— | | | | |
| Pounds | .... | 389 | ..... | ..... |
| Value | $403 | $197 | $7,098 | $3,508 |

## Commercial Methods of Making Carbon Black

In commercial practice there are four different processes of manufacturing carbon black from natural gas. These are the channel system, the small rotating disk, the roller or rotating cylinder, and the large-plate processes. These methods differ mainly in the size and shape of the surface upon which the carbon is collected and the rate of travel of the moving devices. The channel process is probably the best method and is the one most extensively used. Classified according to the quantity of carbon black produced, the order is as follows: Channel process, small rotating disk process, large plate process, and roller process. At present the production of carbon black by cracking or thermal decomposition methods is not extensive.

# Chemical Exposition Next Month of Great Value to the Rubber Industry

THE Eighth National Exposition of Chemical Industries, to be held at the Grand Central Palace, New York City, Sept. 11-16, will undoubtedly prove of the highest importance and value to rubber manufacturers and, indeed, to every member of the rubber industry. Many of the large chemical and machinery concerns specializing in various supplies and equipment that enter into the manufacture of rubber will have exhibits, of which there will be more than 400. Mixing, grinding and packaging machinery; instruments, gages, and similar apparatus; solvents, accelerators, vulcanizing products, pigments, compounding ingredients, etc., will be represented by some of the leading houses.

Among those chemical and allied concerns catering especially to the rubber industry, which will have extensive exhibits at the exposition, will be the following:

The Barrett Company, the Cleveland Cliffs Iron Company, the Commercial Solvents Corporation, the Davison Chemical Company, the Darco Sales Corporation, the Freeport Sulphur Company, the Heyden Chemical Company of America, the Illinois Zinc Company, Innis-Speiden & Company, A. Klipstein & Company, Maas & Waldstein Company, Mallinckrodt Chemical Works, the Marietta Refining Company, the Merrimac Chemical Company, the National Aniline & Chemical Company, the Newport Chemical Works, the New Jersey Zinc Company, Perth Amboy Chemical Works, the Rhodia Chemical Company, the Roessler & Hasslacher Chemical Company, Stein, Hall & Company, Talc & Soapstone Producers Association, the Texas Gulf Sulphur Company, the United Lead Company, Union Sulphur Company, the U. S. Industrial Chemical Company, and the U. S. Industrial Alcohol Company.

### *Many Rubber Chemists to Be in Attendance*

Two manufacturers of hard rubber specialities for chemical uses—The American Hard Rubber Co. and the Luzerne Rubber Co.—will be represented at this year's show, and one or two additional rubber companies may decide to exhibit before the exposition officially opens. It is expected that many rubber chemists from all parts of the country will be in attendance during the week, as well as some officials of rubber manufacturing companies, to learn of the latest developments which have taken place within the past year. A group of rubber chemists from Akron, Ohio, will be present at the annual meeting of the American Chemical Society in Pittsburgh, occurring the previous week, and will then attend the New York exposition. The largest attendance in the history of this Grand Central Palace exhibition is expected this year, estimated at more than 100,000 chemists and commercial people interested in this important field of industrial activity.

### *Extensive Motion Picture Program*

A novel and at the same time extremely valuable feature of the 1922 expostion will be the number of motion picture subjects to be shown at the evening sessions. Some of these reels covering topics of great practical interest to the chemical and rubber industry are new this year and have not been seen by most of the delegates. The film program, so far as it had been listed up to the time of our going to press, is as follows:

"Recovering Values from Fume and Smoke" (1 reel), Courtesy U. S. Bureau of Mines and Research Corporation.

"Inspiration: One of the World's Great Copper Mines" (3 reels), Courtesy U. S. Bureau of Mines.

"The Story of Sulphur" (2 reels), Courtesy U. S. Bureau of Mines and Texas Gulf Sulphur Company.

"Mexican Petroleum" (4 reels), Courtesy U. S. Bureau of Mines.

"The Story of Heavy Excavating Machinery" (4 reels), Courtesy of the U. S. Bureau of Mines.

"The Story of Abrasives" (4 reels), Courtesy of the U. S. Bureau of Mines and the Carborundum Company.

"The Story of Air Reduction" (4 reels).

"The Story of Natural Gas" (4 reels).

"The Story of Asbestos" (4 reels), Courtesy of Johns-Manville, Inc.

"Fire Fighting with Foamite Firefoam", Courtesy Foamite Firefoam Company.

"The Manufacture of Newsprint Paper at the Spanish River Pulp and Paper Co. Mills in Ontario" (8 reels), Courtesy The G. H. Mead Company.

"Nickel and Copper Mining, Smelting, and Refining" (3 reels), Courtesy International Nickel Company—with speaker.

"The Romance of Cotton" (1 reel), illustrated with address by Dr. David Wesson of Southern Cotton Oil Company.

"Prospecting for Gold in Northern Ontario" and "Assaying for Gold in Northern Ontario" (3 reels), Courtesy of the Ontario Department of Mines.

### *Standardization Program*

The Standardization Program, to which one afternoon session will be devoted, will be of especial interest to the readers of THE RUBBER AGE in view of the series of articles on "Scientific Management for Rubber Manufacturers", now running in this publication, by Alfred Baruch, the well-known industrial engineer. In our Aug. 10 issue Mr. Baruch had a comprehensive article on this subject of "Standardization" which was quite timely and which those in attendance at the standardization session might read and digest with profit.

The titles of the six papers which follow will indicate the character of industrial and scientific standardization to be discussed at this special afternoon session:

"Moderation in Standardization" by W. D. Collins of the United States Geological Survey.

"Standardization Testing Apparatus" by N. F. Harriman of the United States Bureau of Standards.

"Discussion of the Reasons for the Varieties of Sizes and Shapes in Glass Bottles" by J. G. Jennings, general representative of the Glass Container Association.

"What Has Been Accomplished in the Standardization of Scientific Apparatus" by J. M. Roberts, Secretary of the Association of Scientific Apparatus Makers of the United States of America.

"Standardization of Fire Clays and Refractories" by Ross C. Purdy, Secretary of the American Ceramic Society, and Chairman of the Committee on Refractories of the American Society for Testing Materials.

"Standardization of Enameled Ware for Chemical Purposes" by Emerson P. Poste of Elyria Enameled Products Co.

### *Hoover and Wheeler "Star" Speakers*

Two "star" speakers are on the exposition program—Herbert Hoover, secretary of commerce, who is to address the annual convention of the Salesmen's Association of the American Chemical Industry, at Grand Central Palace, on "Standardization, and What It Can Do for the American Chemical Industry"; and Wayne B. Wheeler, general counsel for the Anti-Saloon League, who will speak on "The Attitude of the Anti-Saloon League toward Industrial Alcohol".

Chemicals, compounding ingredients, pigments, and the like are playing such an increasingly important part in the manufacture of tires, tubes, and rubber goods of all description that this year's exposition, more than any other of recent years, promises to be of the highest practical value to all branches of the rubber industry.

# A Successful Retail Rubber Goods Business

ONE of the few exclusive rubber goods stores and mail order houses in the United States is that of the Lewiston Rubber Company, of Lewiston, Maine. It was established in 1914 with a complete line of rubber goods of every description, including rubber footwear, tennis shoes, druggists' sundries, raincoats, mechanical rubber goods, stationers' rubber sundries, bicycles, tricycles, velocipedes and children's automobiles.

In addition to a large retail business in Lewiston and surrounding towns, the company does an extensive mail order business especially in rubber bands, receiving orders from as far as California, Alaska, Cuba, and Porto Rico. The company also owns the Rainville Rubber Company which manufactures a baby folding bathtub of wood and rubber, which has no metal in its construction and no folded seams or crevices.

The Lewiston Company publishes a 36-page illustrated catalog of rubber goods which it stocks and sells over the counter and by mail, and this is one of the most complete retail lists issued by any store. A sign on the front of the store reads: "No Matter What, If It Is Rubber We Have It." According to this catalog, the house has on its books thousands of mail order customers all over the country.

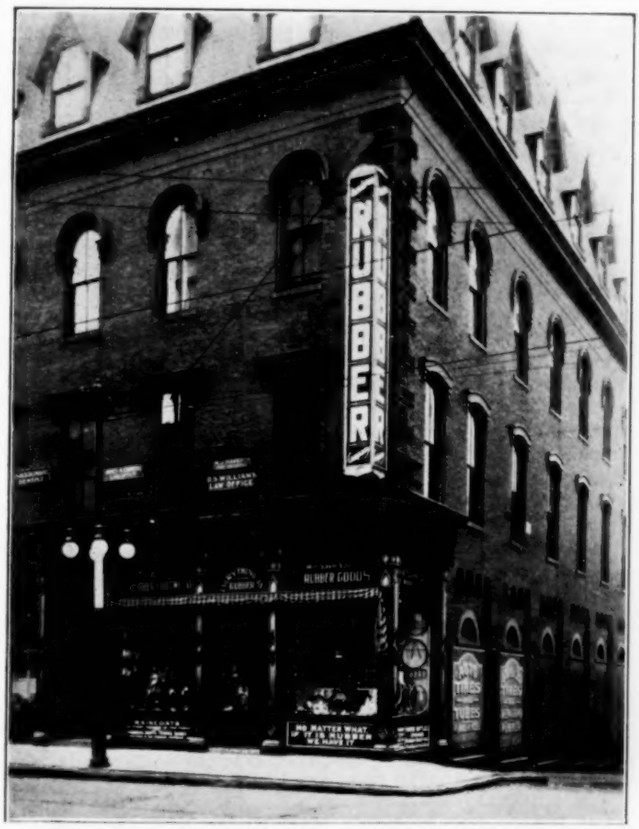
JOSEPH A. RAINVILLE
Manager of the Lewiston Rubber Co. and The Rainville Rubber Co.

The accompanying illustrations show the exterior and interior of the store and the arrangement of the stock room in which the extensive lines are carried. Joseph A. Rainville is manager of both companies, and the success of the business is attributed to his knowledge of rubber and manufactured rubber articles and his ability to capitalize such knowledge over the retail counter and by mail.

INTERIOR OF THE RETAIL STORE OF THE LEWISTON RUBBER CO., LEWISTON, MAINE

## Rubber In-Set Wash-Bowl

After contracting an eye disease from using a public wash bowl, a man set about devising some means of carrying his wash bowl with him. The result is a portable rubber in-set for the public bowl which is used only as a place in which to set the rubber bowl, a source of water, and a place in which to empty and drain the soapy water when the user has finished washing. The person who travels around with this handy rubber bowl certainly takes no chances.




EXTERIOR OF THE RETAIL STORE OF THE LEWISTON RUBBER CO., LEWISTON, MAINE

## New Rubber-Soled Golf Shoe

Something new in a rubber-soled golf shoe for men is soon to be put on the market by a prominent manufacturer The new sole, which is said to be 65 per cent pure rubber, contains an insert of the kind of material that is used in making cord tires for automobiles. It is claimed for this sole that it is the lightest one made of rubber, that it is an absolute nonconductor of heat and cold, and that it does not increase the cost of the shoe over the expense of the ordinary leather sole. The makers think so well of it that they guarantee to resole without charge any shoe that does not give satisfactory wear. The golf shoe in question also has a rubber heel that is similarly constructed, with the added feature of being made with a cup effect that adds to its resiliency. Street shoes for men, similarly equipped, are also to be put out soon by the same manufacturer.

# NEWS OF THE INDUSTRY

## Stockholder's Suits Against Goodyear Involve Millions

MISS LAURA L. T. WEISS, of Cleveland, Ohio, acting for herself and other stockholders, has filed four suits in equity, said to involve about $20,000,000, in the Summit county common pleas court of Akron against Goodyear officials, bankers and others identified with the reorganization of the Goodyear Tire & Rubber Company.

The defendants named in the first suit are Leonard Kennedy & Co., Inc., of New York City, and the directors of the Goodyear Company, complaining of the service contract entered into in May, 1921, between Kennedy and Goodyear. The plaintiff avers that by the terms of this contract the company has sought to delegate to the Kennedy concern the sole and absolute power to select a president and treasurer for the company and to manage its affairs; that the compensation of $250,000 a year is many times in excess of fair and reasonable salaries for these two officers, and that the additional compensation of five per cent of the profits up to $20,000,000 annually, if paid by the company, will be paid without any consideration or for any benefit conferred upon the Goodyear Company, and that such payment amounts to a misappropriation, dissipation and giving away of the assets and property of the company. The plaintiff asks the court to annul and cancel the agreement and to enjoin the directors of the company from performing the contract and making any compensation payments thereunder.

### *Wants Controlling Stockholders Ousted*

In the second suit Miss Weiss names as the principal defendants John Sherwin, chairman of the board of the Union Trust Co., Cleveland; Clarence Dillon, head of the bond house of Dillon, Read & Co., New York; Owen D. Young, vice president of the General Electric Co., New York. She says that on May 12, 1921, the company filed a certificate of reorganization in the office of the secretary of state of Ohio, which provided among other things for the creation of 10,000 shares of management stock which had the right, to the exclusion of all other classes of capital stock of the company, to elect a majority of the board of directors.

By an agreement entered into about that time between the Goodyear company and the defendants, Sherwin, Dillon and Young, these three among themselves acquired the 10,000 shares so that they have the control of the company for and during the lifetime of the bonds and debentures issued. This agreement further provides that each of these gentlemen, acting as managing trustees, shall receive $10,000 per year plus their expenses not to exceed $10,000 annually.

The plaintiff complains that no consideration of value was ever paid to the company for these shares.

Miss Weiss also says that she, together with many other stockholders, refused to consent to the creation of such management stock and management contract, and protested against the same. She further says that under the laws of Ohio the stock is illegally issued and that the management contract is contrary to public policy and void. She further asks that the certificate of reorganization of the company and the management stock be cancelled, and that the management contract between the company and these defendants be also annulled; and that the defendants be enjoined from voting or attempting to vote the stock.

### *$6,000,000 Interest Wasted, Is Charge*

In the third suit Miss Weiss names as defendants all the directors of the company and the Union Trust Company of Cleveland. She says that in May, 1921, at the time of the refinancing of the Goodyear Company, a first mortgage bond issue was placed upon the property of the company for $30,000,000; that the mortgage provided that each year, on the first days of May and November, the company was, and is, obliged to redeem $750,000 of the principal amount of such bonds at a rate of $120 for each $100 of the principal amount of bonds redeemed, plus accrued interest, the bonds bearing interest at the rate of eight per cent; that there is no provision permitting the company to retire any or all of the bonds at any stipulated figure before the expiration of 20 years, and that the company so far has redeemed $1,500,000 worth of bonds at the rate of $120 for each $100 of the principal amount thereof; that by doing so the company pays each year a premium of $300,000 in excess of the interest of eight per cent per annum, and that if the company is permitted to redeem the bonds according to the mortgage, the sum of $6,000,000 will be paid out by it in excess of the interest provided for the bonds.

She asks that the directors of the company and the Union Trust Company be enjoined from paying out of the assets of the company any rate of interest and premium in excess of eight per cent.

### *Says Bankers Reaped Big Profits*

The defendants in the fourth suit are Goodyear Tire & Rubber Co., Akron; Union Trust Co., Cleveland; Central Union Trust Co., New York; Bank of Manhattan, New York; Irving National bank, New York; National City bank, New York; Blair & Co., New York; Continental & Commercial National bank, Chicago; Girard National bank, Philadelphia; Mellon National bank, Pittsburgh; Old Colony Trust Co., Boston; A. G. Becker & Co., Chicago; Hallgarten & Co., New York; Henry B. Manton, Akron; C. R. Erwin, Chicago; E. E. Mack, Canton; Russell L. Robinson, Akron; and Francis Seiberling.

In this suit the petition complains that at the time of the refinancing $27,500,000 of debenture bonds were issued by the company bearing interest at the rate of eight per cent per annum, and that at that time 275,000 shares of the common stock of the company were issued as a bonus or gratuity in connection with the issue and sale of these debenture bonds, which were underwritten and purchased by the group of bankers and bond houses named as defendants; that for these 275,000 shares the company received absolutely no consideration whatsoever; that although it was originally contemplated that with each $1,000 debenture bond there was to be given to the public ten shares of the common stock, nevertheless, only a very small portion of this common stock was so given to the public when it purchased these debentures, and that the great bulk thereof is now held among a group of bankers, who have thereby reaped a large profit from the re-financing of the company; and she asks that the defendants surrender this bonus stock to the company, and that the same be cancelled.

Miss Weiss indicates in her petitions that she is acting in the interest of the company and its stockholders, and that the company as a going manufacturing entity is not attacked.

The following statement was issued by the Goodyear management:

### *Company Welcomes Suits as Test*

"The action just instituted by Miss Weiss against the Goodyear Tire & Rubber Company and others, is a stockholders' proceeding to test the legality of the Goodyear re-organization, which was consummated over a year ago.

"Last month the plaintiff served upon the directors a notice attacking practically all features of the Goodyear reorganization and demanding that legal action be instituted accordingly.

"On Friday last, Aug. 5, the board of directors formally declined to take the action demanded and the present suit follows as a natural sequence.

"This plan to secure a full and complete court review of all proceedings had in connection with the re-organization is entirely acceptable to the management, and the action will be adequately defended by the company and, no doubt, tried in due course."

## Goodrich in Aviation Field

The B. F. Goodrich Rubber Co. is back in the field of manufacture of aeronautical rubber products both for lighter than air and heavier than air craft. During the war the company produced various types of balloons and large supplies of tires and other rubber goods for the government. Henry Wacker, formerly with the Curtiss Aeroplane & Motor Corp. and later with the aerial mail division of the United States post office department, has been added to the Goodrich personnel to look after the interests of this branch.

## Mason's New Pittsburg Branch

The Mason Tire & Rubber Co., Kent, Ohio, has opened a new branch office and warehouse in Pittsburg, Pa., under the management of R. W. Mason. The western half of Pennsylvania and the northern half of West Virginia will be covered from this office.

The company has been doing so well in recent months that it has resumed payment of the preferred stock dividends. June sales in the tire department exceeded $1,250,000.

## Tagliabue Sells Mono Devices

The C. J. Tagliabue Mfg. Co., 18 Thirty-third street, Brooklyn, N. Y., has taken over from the Mono Corp. of America the manufacturing and selling rights of its line of gas-analysis instruments for use in the control of combustion and industrial furnaces. F. D. Harger, former general manager for Mono, is now with the Tagliabue company, thus enabling the latter to render expert service on all problems of combusion with reference to these installations.

## Re-Miler Wins Four Year Case

After dragging through the federal courts for four years, the patent infringement suit of the K. & W. Rubber Co., Delaware, Ohio (formerly of Ashland, Ohio), charging the Re-Miler Rubber Co., of Ashland, with imitation of the Maxotire, has been decided in favor of the latter by the United States Circuit Court of Appeals at Cincinnati. Special stress had been placed on the overlapping and semi-cure ideas, but the court ruled that the Re-Miler did not infringe on these features.

## Cleveland Rubber Reorganizes

There has been a reorganization of the board of directors of the Cleveland Rubber Corporation Co., Cleveland, Ohio, and a complete reorganization of the official staff. The change was made in the interest and protection of the creditors and stockholders of the company. The new management hopes to reestablish the credit and good will of the business.

## Parts Convention Sept. 13-15

E. H. Broadwell, vice president and general manager of Fisk Rubber Co., will preside at the fall convention of the Motor and Accessory Manufacturers Association to be held at the Hotel Lafayette, Buffalo, on September 13, 14 and 15. L. L. Smith, assistant treasurer of Goodrich, and H. M. Reinecke, assistant treasurer of Continental Rubber Works, Erie, Pa., are on the committee arranging for the meeting of credit managers. W. O. Rutherford, vice president of Goodrich, will be chairman of the session devoted to foreign trade.

## New $250,000 Corduroy Unit

The directors of the Grand Rapids Tire & Rubber Corp., Grand Rapids, Mich., have authorized the construction of a new factory unit for Corduroy Cord tires, to be built at once and to cost about $250,000. The company is reported rushed with orders, the success of this tire being due largely to the patented sidewall protection feature.

## Samson Working Night and Day

According to the Samson Tire & Rubber Corp., Los Angeles, it is the only factory on the Pacific Coast operating day and night producing cord tires. Three eight hour shifts are employed. Production capacity in some departments has been enlarged 200 per cent, in others 400 per cent, by the addition of $250,000 worth of new buildings and machinery. The first five months of 1922 show a gain of 67 per cent in tire sales over the previous year.

## India Had Good Half-Year

Net sales of the India Tire & Rubber Co., Akron, Ohio, for the seven months of 1922 ending July 31 were $1,088,000, an increase of 46½ per cent over the corresponding period last year. Net earnings for six months were $214,419.37, or 30 per cent on the outstanding preferred and common stock. The daily output of the factory is about 600 tire casings and 800 tubes.

## Everett L. Fuller Dead

Everett L. Fuller, 62 years old, founder of the rubber firm of Fuller, Leonard & Small, later known as the Franklin Rubber Co., of which he was treasurer, died Aug. 5 in Melrose, Mass. He was at one time associated with Goodyear in Akron in the development of rubber tubes, resigning from that company about a year ago because of ill health. Mr. Fuller's father was mayor of Malden, Mass.

When closing down for two weeks on Aug. 4, the Malden, Mass., plant of the Boston Rubber Shoe Co. announced to its 1500 employes that at the reopening on Aug. 21 the factory force would be considerably enlarged.

## Clinton Buys Ohio State Plant

A stockholders' committee of the Clinton Tire & Rubber Co. purchased for $150,000 the plant of the Ohio State Rubber Co. at Port Clinton, Ohio, at the receiver's sale. The property was appraised at $262,000 and the company's indebtedness was about $300,000. The new owners will have the plant in operation by Sept. 15. Additional machinery will bring up the capacity of the factory to 1000 tires and 4000 tubes daily.

Following the sale the name of the Ohio State Rubber Co. was changed to the Wildman Tire & Rubber Co., with these officers: W. W. Wildman, Bay City, Mich., president; F. P. Reichert, Port Clinton, Ohio, vice president; W. A. Twynham, Akron, secretary-treasurer; F. J. Langenau, Cleveland, and H. B. Orr, Bay City, directors.

## Personals

Paul E. Werner, formerly of Akron, Ohio, is now president of the Kansas City Tire & Rubber Co. which is out of receivers' hands and is producing 650 tires daily.

* * *

John F. Evans, who has been manager of the Miller branch at Indianapolis, has been appointed branch manager at Minneapolis. He has been in the rubber business since 1917.

* * *

H. H. Forest, former superintendent of the Sandusky, Ohio, plant of the Erie Tire & Rubber Co., has resigned to become superintendent of Mason's new plant at Bedford, Ohio.

* * *

Dr. W. C. Geer, vice president of Goodrich, will bring out about Oct. 1 a 400-page book entitled "The Reign of Rubber." It will be reviewed in THE RUBBER AGE.

* * *

F. W. Cowles, of the Goodyear crude rubber purchasing department, has left for Singapore, Straits Settlements, with his bride, to represent the company as resident rubber buyer. He was in Singapore about a year ago, representing the Goodyear Co.

* * *

L. M. Van Riper, for the last two years western sales manager for Ajax Rubber Co. in Chicago, has been appointed general sales manager of the Racine Rubber Co., Racine, Wis. He succeeded Russel Y. Cooke who resigned to accept the presidency of the Racine Tire & Rubber Co., of Chicago.

* * *

Roscoe M. Gage is now technical superintendent and assistant to the manager of the New Castle, Pa., factory of the Seiberling Rubber Co. He has been production superintendent at the Barberton, Ohio, plant. Formerly he was chief chemist of the Portage Rubber Co.

## U. S. Rubber Profits

The United States Rubber Co. earned net profits of $3,052,918 for the six months ending June 30, 1922, according to the report of C. B. Seger, chairman of the board of directors. Net income, before deducting interest and other charges, was $6,305,113. Net sales were $73,933,771. Total assets as of June 30 were $132,745,000, including $56,752,000 in cash and accounts receivable and $75,993,000 in inventories of finished goods and raw materials. Liabilities were $46,352,000. The surplus account stood at $30,231,456.

On Dec. 1, 1922, the company will retire its five-year seven per cent gold notes, due a year later, amounting to $6,000,000. Arrangements have been made to sell $7,000,000 five per cent gold bonds, due January 1, 1947, to provide funds for such retirement. This will reduce annual interest charges $70,000.

## Fisk Sales Gain 23 1-2 Per Cent

The semi-annual report of the Fisk Rubber Co. for the first six months of this year shows a gain in net sales of 23½ per cent, compared with the same period in 1921, and in unit sales of 85 per cent. Net profits were $1,774,024, and the surplus account increased to $2,984,608. Total assets were $27,910,432 and liabili- $9,737,417. There was a reduction of thirty per cent in inventories. The company reports no forward commitments at other than current prices. Stocks of rubber and fabric on hand cover production requirements for immediate use. Finished products are at a minimum, based on present sales.

## $37,500 Tire Deal

The Bartlett Tire Co., a Tennessee concern, has purchased for $37,500 a lot of 5600 fabric tires from the receivers of the Tuscora Rubber Co., New Philadelphia, Ohio. Only cord tires will be made at this plant hereafter.

## Goodrich $25,000,000 Mortgage

Realty, plants, machinery, equipment and other property of the B. F. Goodrich Co. at Akron and elsewhere have been pledged to the Bankers' Trust Co. of New York, as trustee, to secure a 6½ per cent gold bond issue of $25,000,000. The mortgage for this amount was filed with the register of New York county on Aug. 2. The Goodrich building at Broadway and 57th street, New York City, was included.

## N. J. Zinc Income Trebled

For the three months ending June 30 the total income of the New Jersey Zinc Co. is reported at $1,637,161 after charging off ordinary taxes, maintenance of equipment plant, and depreciation, as compared with $637,440 in 1921 and $3,341,577 in 1920. Net income, after allowing for interest and special reserves, was $1,586,645 against $583,927 in 1921 and $2,756,577 in 1920. The general improvement in business is reflected by the improved financial position of this company.

## Master Plant Sold for $75,000

The court has confirmed the sale of the assets of the Master Tire & Rubber Co., Dayton, Ohio, to the law firm of Estabrook, Finn & McKee, acting for the Universal Securities Co., Charles W. Hoffritz, president, for $75,000. The latter will assume direction of the plant which will soon resume operations.

## Akron's New Record for July

All records for tire production in Akron were broken by the end of July, 1922, when a total of more than 2,750,000 tires was recorded. During the latter half of the month an average of 107,000 tire casings was produced daily, the greatest in the history of "The Rubber City."

## Goodyear Broke Record in June

June, 1922, was the biggest month in the history of the Goodyear Tire & Rubber Co., according to the report of President E. G. Wilmer. The company sold and delivered 779,590 automobile tires during the thirty days ending June 30. The previous peak was in March 1920, amounting to 734,948.

Net sales of the company for the first six months of this year were $51,410,240. Net earnings available for interest and other charges were $5,501,793. The balance credited to surplus was $1,915,889, and the surplus of June 30 was $5,535,933. Cash, United States treasury certificates, and other securities were valued at $18,151.092.

PROFIT AND LOSS ACCOUNT

| | |
|---|---|
| Net sales | $ 51,410,240 |
| Manufacturing cost | 48,118,803 |
| Profits of subsidiaries | 2,210,356 |
| Earnings available for interest | 5,501,793 |
| Interest | 2,400,105 |
| Proportion of bond discount and reorganization expense written off | 1,185,799 |
| Carried to surplus | 1,915,889 |

ASSETS

| | |
|---|---|
| Properties, plants depreciated | $ 52,431,515 |
| *Investments in subsidiaries | 31,933,055 |
| Inventories | 32,756,663 |
| Receivable, less reserve | 14,603,401 |
| U. S. certificates, other securities | 8,590,956 |
| Cash | 9,560,137 |
| Special accounts and A. C. & Y. R. R. and other securities, good will, patents | 12,500,000 |
| Prepaid insurance, dis. on bonds and debentures, reorganization expense | 6,435,999 |
| Total | $168,811,726 |

* Cumulative dividends have accrued from Oct. 1, 1920, on 7 per cent preferred stock of Goodyear of California of par value of $7,995,800.

LIABILITIES

| | |
|---|---|
| Capital stock | $ 95,992,100 |
| First mortgage 8 per cent 20-year bonds | 28,500,000 |
| Debenture 8 per cent 10-year bonds | 27,500,000 |
| Trade accounts payable | 4,797,720 |
| Notes payable | 80,500 |
| Accrued int. and premiums on bonds | 1,345,334 |
| Reserves | 5,060,139 |
| Surplus Dec. 1, 1921. $3,620,043. plus surplus June 30, 1922, of $1,915,889 | 5,535,933 |
| Total | $168,811,726 |

Note—Contingent liability in respect of guarantors on notes (secured), $320,000.

The Eureka Rubber Co., whose building is at Pierce and Ninth Avenues, Long Island City, N. Y., has leased the ground floor for a term of years to the Kashmir Finishing Co.

## Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires

November, 1920 to June 1922

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

(Compiled by The Rubber Association of America, Inc.)

| MONTH | PNEUMATIC CASINGS | | | | INNER TUBES | | | | SOLID TIRES | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Mfrs. Reporting | Inventory | Production | Shipments | No. Mfrs. Reporting | Inventory | Production | Shipments | No. Mfrs. Reporting | Inventory | Production | Shipments |
| November, 1920 | 36 | 5,880,016 | 649,742 | 806,023 | 40 | 6,131,935 | 742,815 | 920,938 | 11 | 298,875 | 21,355 | 34,217 |
| December, 1920 | 43 | 5,508,380 | 506,111 | 1,327,153 | 43 | 5,786,929 | 508,446 | 1,481,285 | 12 | 303,473 | 16,297 | 40,828 |
| January, 1921 | 45 | 5,319,605 | 703,430 | 965,417 | 47 | 5,586,163 | 740,824 | 1,042,617 | 12 | 303,753 | 21,220 | 29,116 |
| February, 1921 | 45 | 5,193,018 | 819,892 | 1,073,756 | 46 | 5,415,464 | 916,627 | 1,129,881 | 12 | 304,374 | 23,365 | 29,599 |
| March, 1921 | 46 | 4,597,103 | 1,163,314 | 1,614,651 | 48 | 5,044,861 | 1,346,483 | 1,643,690 | 12 | 283,800 | 28,710 | 43,926 |
| April, 1921 | 49 | 4,527,445 | 1,651,418 | 1,785,951 | 51 | 4,916,772 | 1,762,122 | 1,983,571 | 12 | 269,985 | 28,859 | 42,080 |
| May, 1921 | 59 | 4,451,668 | 2,100,917 | 2,085,882 | 57 | 4,751,880 | 2,210,040 | 2,342,567 | 12 | 264,663 | 35,156 | 40,122 |
| June, 1921 | 63 | 4,154,456 | 2,313,265 | 2,643,850 | 60 | 3,835,098 | 2,359,928 | 3,232,673 | 11 | 240,336 | 28,395 | 49,867 |
| July, 1921 | 63 | 3,892,037 | 2,570,524 | 2,757,581 | 61 | 3,122,815 | 3,020,981 | 3,603,248 | 11 | 220,003 | 35,123 | 55,678 |
| August, 1921 | 66 | 3,934,853 | 3,043,187 | 2,894,442 | 64 | 3,649,319 | 4,430,152 | 3,804,060 | 11 | 216,367 | 55,694 | 66,866 |
| September, 1921 | 63 | 3,340,798 | 1,929,268 | 2,047,929 | 62 | 3,827,830 | 3,274,822 | 2,645,758 | 11 | 161,832 | 37,441 | 50,276 |
| October, 1921 | 64 | 3,545,030 | 1,928,271 | 1,675,169 | 64 | 4,732,016 | 2,843,918 | 2,016,371 | 10 | 163,299 | 46,274 | 45,911 |
| November, 1921 | 64 | 3,908,342 | 1,756,555 | 1,342,519 | 63 | 5,203,568 | 2,126,211 | 1,540,299 | 10 | 173,451 | 43,537 | 34,556 |
| December, 1921 | 64 | 3,696,519 | 1,839,738 | 1,980,264 | 64 | 4,731,021 | 2,070,098 | 2,522,710 | 10 | 168,515 | 40,478 | 39,520 |
| January, 1922 | 66 | 4,174,216 | 2,055,134 | 1,596,806 | 66 | 5,246,647 | 2,343,393 | 1,889,724 | 11 | 181,769 | 40,224 | 33,294 |
| February, 1922 | 66 | 4,691,329 | 2,084,308 | 1,562,365 | 65 | 6,141,956 | 2,596,774 | 1,702,583 | 11 | 183,448 | 39,492 | 36,805 |
| March, 1922 | 63 | 5,183,286 | 2,645,790 | 2,073,963 | 63 | 6,991,118 | 3,017,511 | 2,090,737 | 11 | 182,197 | 49,433 | 48,350 |
| April, 1922 | 65 | 5,464,336 | 2,401,187 | 2,086,651 | 65 | 7,230,096 | 2,650,573 | 2,329,343 | 11 | 173,748 | 46,664 | 52,309 |
| May, 1922 | 65 | 5,523,095 | 2,721,503 | 2,639,273 | 65 | 7,189,552 | 2,970,696 | 2,938,947 | 11 | 170,904 | 57,640 | 60,711 |
| June, 1922 | 64 | 5,042,147 | 2,838,890 | 3,133,260 | 64 | 6,186,534 | 3,130,629 | 3,973,679 | 11 | 169,808 | 66,089 | 63,408 |

# MARKETS

## Cottons and Fabrics

NEW YORK, AUGUST 15, 1922

THE bullish effect of the Government cotton crop report issued on August 1 showing the astonishingly low condition of 70.8—a condition markedly in contrast to all private estimates—wore off quickly. During the day on which the report was made public December contracts advanced to 22.9 cents; within 15 points of the end-of-June report which was the season's high record. Aggressive selling, due in a measure to some skepticism as to the accuracy of the official estimate, brought about violent declines during the next ten days that forced prices close to 20 cents.

Cotton instead of holding its advance had declined over $14 a bale since the day the Government issued one of the most bullish reports ever known. The goods market showed evidences of weakness in sympathy with the drastic decline in cotton prices.

At Washington, on July 9, when cotton was at the 20 cent level, Senator Smith of South Carolina introduced a resolution proposing an investigation of charges that "undue methods or practices are being employed by the trade in restraining the natural operations of the law of supply and demand." His resolution recited that: The cotton carry-over was less than normal——that reports on the growing crop indicated a yield below the world demand——that the boll weevil damage was more extensive and severe than ever before in history——that the yield of cotton was entirely problematical ——and that "the price of cotton in the markets had failed utterly to respond to these conditions." Senator Smith made public a letter from the president of the American Cotton Association noting that since the government's crop report was issued the market had gone down every day and stating that he had received information from most reliable sources, "that a powerful combine has been formed for the purpose of beating cotton prices down, it being stated that this combine is composed of some of the biggest financial interests in New York, some of the biggest speculators there and some of the biggest speculators in England and that they boast that they will beat the price of cotton down to 15 cents."

#### *Cotton Mills Speeding Up*

Reports indicate that the cotton mills throughout the country have materially increased operations during recent months. During June the industry ran at about 91 per cent of normal compared with 89 per cent in May and 84 per cent in April. The mills consumed 507,869 bales of cotton in June compared with 495,674 in May and 446,843 in April. With the industry at its best 535,000 bales are consumed each month.

#### *Supply in Hand Exceedingly Small*

At the end of June the total supply of cotton in all hands in the United States was 3,592,000 bales, compared with 7,425,000 on the same date last year and an average of 5,072,000 during the last four years. Stocks in public and private storage, on plantations, in transit and at compressors were 2,260,000 bales this year, compared with 6,232,000 last year and an average of 3,739,000 during the past four years. Spinners stocks were 1,332,000 bales this year, compared with 1,203,000 last year and an average of 1,448,000 during the past four years.

#### *July Shipments of Burlaps*

Estimates of burlap shipments from Calcutta during July show a total of about 85,000,000 to 87,000,000 yards to the United States. This will not go far toward making up the shortage of 50,000,000 yards in June when normal requirements are placed at about 80,000,000 yards. One estimate of the July shipments reported 76,000,000 yards to the East Coast and 9,000,000 yards to Pacific ports.

### *EXTRA STAPLE COTTON*

The extra staple markets were very irregular and showed a lower trend than at any period for several months. For a few days there was some little activity in Pima but the total did not run into large figures. Sales of full stapled No. 2 were made around 36 cents and some No. 1 of an inch and a half to nine sixteenth staple were bought at that figure. During the last week Egyptians sagged off badly and medium grade upper were reported sold at 25 cents. Sea Island cotton continued inactive. For medium grade Peruvian Mitafifi 28 cents was quoted. The following quotations represent the average level of prices on strict middling cotton: 1⅛ inch, 29 to 30 cents; 1 3/16 inch, 31 to 33 cents; 1¼ inch, 34 to 36 cents; 1 5/16 inch, 36 to 39 cents.

### *EGYPTIAN COTTON*

Exports of cotton from Alexandria during July were 28,000,000 pounds, compared with 39,300,000 the previous month. Arrivals at Alexandria were 12,400,000 pounds compared with 19,800,000 for the previous month and stocks in all hands on July 31 approximated 168,000,000 pounds, compared with 183,800,000 pounds on June 30.

### *TIRE FABRICS*

Business in tire fabrics has become very dull and no special activity is looked for before the fall. The following prices were heard in the trade:

| | | | |
|---|---|---|---|
| **CORD FABRICS** | | | |
| Combed Sakellarides | lb. | .78 @ | .80 |
| Carded Sakellarides | lb. | .71 @ | .73 |
| Combed Peeler | lb. | .66 @ | .68 |
| Carded Peeler | lb. | .52 @ | .55 |
| Combed Egyptian uppers | lb. | .65 @ | .67 |
| Carded Egyption uppers | lb. | .57½ @ | .63 |
| **SQUARE WOVEN** | | | |
| 17¼-ounce Egyptian uppers, combed | lb. | .60 @ | .62 |
| 17¼-ounce Egyptian uppers, carded | lb. | .52½ @ | .58 |
| **17¼-ounce Sakellarides, combed** | lb. | .75 @ | .79 |
| **17¼-ounce Sakellarides, carded** | lb. | .68 @ | .71 |
| 17¼-ounce Peeler, combed, | lb. | .58½ @ | .62½ |
| 17¼-ounce Peeler, carded, | lb. | .47 @ | .50 |

*Sheetings*—The market ruled very quiet, most of the business passing being in small lots. There were sales of 40 inch, 3.60 yard, at 11⅛ cents and 40 inch, 2.85 yard brought 12 cents net while 40 inch, 2.50 was quoted 14¼ to 14½ cents.

*Ducks*—There was very little activity in this market. Single filling remained the same at 17 at 18½ cents and double filling 19 at 19½ cents. Hose and belting were a little stronger at 36½ at 37½ cents. Enameling was easy at 39 cents.

*Burlaps*—Business was quite brisk at the lowered prices. There have been marked and rapid declines in the primary market the past two weeks in spite of the shortage that must necessarily result from the depleted June shipments resulting from the recent dock strikes.

| | | | |
|---|---|---|---|
| **SHEETINGS** | | | |
| 40-inch 2.50-yard | yd. | .14¼ @ | .14½ |
| 40-inch 2.85-yard | yd. | .12 @ | — |
| 40-inch 3.15-yard | yd. | .14 @ | — |
| 40-inch 3.60-yard | yd. | .11⅛ @ | .11¼ |
| 40-inch 3.75-yard | yd. | .10 @ | — |
| 40-inch 4.25-yard | yd. | .09 @ | .09¼ |
| **DUCKS** | | | |
| Belting | lb. | .36½ @ | .37½ |
| Hose | lb. | .36½ @ | .37½ |
| Enameling | lb. | .39 @ | .42 |
| Shoe Ducks | lb. | .45 @ | .46 |
| Single Filling | lb. | .17 @ | .18½ |
| Double filling | lb. | .19 @ | .19½ |
| **BURLAPS (Carload Lots)** | | | |
| 8 -ounce 40-inch | 100 yds. | 6.00 @ | — |
| 7½-ounce 40-inch | | 5.95 @ | — |
| 10 -ounce 40-inch | | 8.90 @ | 9.00 |
| 10½-ounce 40-inch | | 9.00 @ | 9.10 |
| **DRILLS** | | | |
| 37-inch 3.25-yard | yd. | .11½ @ | — |
| 37-inch 2.75-yard | yd. | .13¼ @ | — |
| 37-inch 3.00-yard | yd. | .12¼ @ | — |
| 37-inch 3.50-yard | yd. | .11 @ | — |
| 37-inch 3.95-yard | yd. | .10 @ | — |
| **OSNABURGS** | | | |
| 30-inch 7-ounce | | .13 @ | .13¼ |
| 40-inch 7-ounce | | .13½ @ | — |

# Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, AUGUST 15, 1922—The tone of the industrial chemical market was very strong the first weeks of August. The demand for many items, in fact, was abnormally active as buyers came into the market for supplies to carry them over the strike period. Some manufacturers indeed have been compelled to curtail production on account of the scarcity of coal, and for that reason there is little surplus of certain items. Of all the influences bearing down upon the market the delay in final action on the tariff is the most unsettling. In every division of the market there are articles on which it is proposed to increase the duty materially. Considering the depressing influence of these unsettling factors—the tariff situation, the coal strike and the railroad strike—the market has displayed steadiness and strength that were hardly to be expected. An early settlement of these troubles would soon start the market toward normal business.

## ACCELERATORS

### *Organic*

| | | | |
|---|---|---|---|
| **Aldehyde ammonia, crystals** ...lb. | $ .95 | @ | .98 |
| Aniline oil, bulk basis, ...lb. | .15 | @ | .18 |
| Excellerex, .....lb. | .40 | @ | — |
| Formaldehyde-Aniline ....lb. | .50 | @ | — |
| Hexamethylene-tetramine ..lb. | .72 | @ | .75 |
| Paraphenylenediamine ....lb. | 1.55 | @ | 1.57 |
| Thiocarbanilide .....lb. | .27 | @ | .38 |
| Vulcocene .....lb. | .35 | @ | — |

### *Inorganic*

| | | | |
|---|---|---|---|
| Lead, dry red bbls. .....lb. | .09 | @ | .09¼ |
| Lead, white, basic carbonate lb. | .07¼ | @ | .08 |
| Litharge, domestic .....lb. | .08½ | @ | .08¾ |
| imported .....lb. | .17 | @ | — |
| Lime, Superfine .....lb. | .02 | @ | .02½ |
| Magnesia, calcined, light, .....lb. | .24 | @ | .25 |
| extra light .....lb. | .45 | @ | — |
| heavy .....lb. | .05 | @ | .05½ |
| Orange Mineral .....lb. | .12 | @ | .14 |

## COLORS

### *Blacks*

| | | | |
|---|---|---|---|
| Carbon Black .....lb. | .16 | @ | .20 |
| Micronex .....lb. | .17 | @ | .24 |
| Lamp Black .....lb. | .12 | @ | .40 |
| Bone " .....lb. | .05½ | @ | .07½ |
| Drop " .....lb. | .07½ | @ | .16 |
| Ivory " .....lb. | .15 | @ | .45 |

### *Blues*

| | | | |
|---|---|---|---|
| Prussian .....lb. | .50 | @ | .60 |
| Ultramarine .....lb. | .08 | @ | .35 |
| Cobalt .....lb. | .21 | @ | .26 |

### *Browns*

| | | | |
|---|---|---|---|
| Iron oxide .....lb | .04½ | @ | .05 |
| Sienna, Italian, .....lb. | .05½ | @ | .06 |
| Umber Turkey, .....lb. | .04 | @ | — |
| Vandyke, domestic ..... | .03½ | @ | .04½ |

### *Greens*

| | | | |
|---|---|---|---|
| Chrome, light, c. p. ..lb. | .30 | @ | .32 |
| medium .....lb. | .35 | @ | .36 |
| dark .....lb. | .36 | @ | .45 |
| commercial .....lb. | .12 | @ | — |
| Rubber Makers Green lb. | 3.50 | @ | — |

### *Reds*

| | | | |
|---|---|---|---|
| Antimony, crimson ...lb. | .33 | @ | .40 |
| golden .....lb. | .17½ | @ | .25 |
| red sulphuret .....lb. | .20 | @ | .22 |
| Indian, English, pure lb. | .12 | @ | .15 |
| Para toner .....cwt. | 1.25 | @ | 1.40 |
| Rubber makers red ..lb. | 3.50 | @ | — |
| purple .....lb. | 2.50 | @ | — |
| Toluidine toner .....lb. | 2.10 | @ | — |
| Tuscan red .....lb. | .17½ | @ | .35 |
| Venetian red .....lb. | .03½ | @ | .06 |
| Vermillion, quicksilver, English .....lb. | .90 | @ | — |
| domestic .....lb. | .25 | @ | .30 |

### *Whites*

| | | | |
|---|---|---|---|
| Albalith .....lb. | .06 | @ | .06½ |
| Aluminum bronze ....lb. | .55 | @ | .60 |
| Asolith .....lb. | .06 | @ | .06½ |
| Lithopone, domestic (factory) .....lb. | .06 | @ | .06½ |
| Zinc oxide. American Horse Head Special ...lb. | .07½ | @ | .08 |
| XX red .....lb. | .07 | @ | .07½ |

| | | | |
|---|---|---|---|
| **American Azo:** ZZZ (lead free) ....lb. | .07 | @ | .07½ |
| ZZ (under 5 per cent leaded) .....lb. | .06¼ | @ | .06¾ |
| Z (8-10 per cent leaded) | .06 | @ | .06¼ |
| Zinc oxide, French process, White seal lb. | .11 | @ | .11¼ |
| Green seal .....lb. | .09¾ | @ | .10¼ |
| Red seal .....lb. | .08¾ | @ | .09¼ |

### *Yellows*

| | | | |
|---|---|---|---|
| Chrome, light, c. p. ..lb. | .16 | @ | .17 |
| dark .....lb. | .16 | @ | .17 |
| medium .....lb. | .16 | @ | .17 |
| Ocher, French .....lb. | .02½ | @ | .03½ |
| domestic .....lb. | .02 | @ | .03 |
| Rubber Makers' Yellow, ..lb. | 3.50 | @ | — |

## COMPOUNDING INGREDIENTS

| | | | |
|---|---|---|---|
| Aluminum flake .....ton | 30.00 | @ | — |
| hydrate .....lb. | .17 | @ | .18 |
| Ammonia carbonate, .....lb. | .07 | @ | .08¾ |
| Barium carbonate .....ton | 60.00 | @ | — |
| Barytes, southern off-color, ton | .15 | @ | .17 |
| Western, prime white, ton | 23.00 | @ | — |
| Basofor .....lb. | .04¾ | @ | — |
| Blanc fixe, dry, f.o.b. works lb. | .04¼ | @ | .04½ |
| Carrara filler .....ton | 18.00 | @ | — |
| Chalk, precipitated, extra light .....lb. | .03½ | @ | .04¼ |
| heavy .....lb. | .02½ | @ | .03¼ |
| Clay, China, domestic, ...ton | 15.00 | @ | 16.50 |
| imported .....ton | 15.00 | @ | 22.00 |
| Dixie .....ton | 22.00 | @ | 32.00 |
| Blue Ridge .....ton | 22.00 | @ | 32.00 |
| Fossil flour .....ton | 60.00 | @ | — |
| Glues, extra white .....lb. | .30 | @ | .40 |
| medium white .....lb. | .20 | @ | .26 |
| cabinet .....lb. | .18 | @ | .30 |
| cabinet low grade ....lb. | .15 | @ | .18 |
| common bone .....lb. | .08½ | @ | .14 |
| Graphite flake, bbls. .....lb. | .05 | @ | .12 |
| amorphous .....lb. | .05 | @ | — |
| Infusorial earth, powdered ton | 60.00 | @ | — |
| bolted .....ton | 65.00 | @ | — |
| Mica, powdered .....lb. | .15 | @ | — |
| Rotton Stone (powdered) lb. | .02½ | @ | .04½ |
| Silica (gold bond) .....ton | 40.00 | @ | 50.00 |
| Soapstone, powdered ....ton | 15.00 | @ | 20.00 |
| Starch, powdered corn ..cwt. | 2.85 | @ | 2.95 |
| Talc, domestic .....ton | 15.00 | @ | 18.00 |
| French .....ton | 22.50 | @ | 30.00 |
| French, high grade ..ton | 40.00 | @ | 45.00 |
| Italian, .....ton | 44.00 | @ | 55.00 |
| Terra Alba .....ton | 23.00 | @ | — |
| Tripoli, white .....ton | 27.50 | @ | 32.50 |
| Whiting, commercial ....cwt. | 1.10 | @ | — |
| Quaker .....ton | 13.00 | @ | 15.00 |
| English cliffstone ..cwt. | 1.70 | @ | 1.90 |
| gilder's bolted ...cwt. | 1.15 | @ | 1.25 |
| Paris white American cwt. | 1.35 | @ | 1.45 |
| Wood pulp XXX .....ton | 27.50 | @ | — |
| " " X .....ton | 22.50 | @ | — |
| Zinc Oxide— 5 per cent leaded ..... | .06¼ | @ | .06¾ |
| 10 per cent lead sulphate .....lb. | .06 | @ | .06½ |
| 20 per cent lead sulphate .....lb. | .06 | @ | .06½ |
| 35 per cent lead sulphate .....lb. | .06 | @ | .06½ |

*(Also see whites)*

## MINERAL RUBBER

| | | | |
|---|---|---|---|
| Gilsonite .....ton | 70.00 | @ | — |
| Genasco (factory) .....ton | 50.00 | @ | — |
| Hard hydrocarbon .....ton | 32.00 | @ | 42.00 |
| Soft hydrocarbon .....ton | 30.00 | @ | 35.00 |
| Pioneer M.R. .....ton | 42.00 | @ | 44.00 |
| 320 M. P. hydrocarbon (c. l. factory) .....ton | 45.00 | @ | 50.00 |
| 300/310 M. P. hydrocarbon (c. l. factory) ton | 40.00 | @ | 43.00 |
| Synpro, granulated, M.R. (factory) .....ton | 54.50 | @ | 70.00 |

## SOFTENERS

### *Acids*

| | | | |
|---|---|---|---|
| Acetic, 28 per cent cwt. | 2.67 | @ | 3.42 |
| Phenol .....lb. | .12 | @ | .18 |
| Cresylic, 97 p. c. ....lb. | .56 | @ | .58 |
| 95 p. c. .....lb. | .51 | @ | .53 |
| Muriatic, 20 degrees cwt. | 1.10 | @ | 1.25 |
| Nitric, 36 degrees .cwt. | 4.75 | @ | 5.25 |
| Sulphuric, 66 degrees ton | 14.00 | @ | 16.00 |
| 60 degrees, bulk ..ton | 9.00 | @ | 11.00 |
| Tartaric, crystals ....lb. | .30 | @ | — |

### *Alkalies*

| | | | |
|---|---|---|---|
| Caustic soda, 76 p.c. cwt. | 3.75 | @ | 3.90 |
| Soda ash, 58 p.c. ..cwt. | 1.95 | @ | 2.30 |

### *Oils*

| | | | |
|---|---|---|---|
| Castor, No. 3, bbls. ..lb. | .12½ | @ | — |
| Corn, crude, bbls. ...lb. | .09¾ | @ | — |
| refined .....lb. | .11¾ | @ | — |
| Chinawood, bbls. ....lb. | .12 | @ | .12¼ |
| Cottonseed, .....lb. | .08½ | @ | .09 |
| Glycerine, drums ....lb. | .16¼ | @ | .16¾ |
| Linseed, domestic ...gal. | .82 | @ | .83 |
| imported .....gal. | .84 | @ | .85 |
| Palm, Niger .....lb. | .05¾ | @ | .06 |
| Lagos .....lb. | .07 | @ | .07½ |
| Peanut, domestic, crude lb. | .12 | @ | .12¼ |
| Petrolatum, amber ..lb. | .04½ | @ | .04¼ |
| dark amber .....lb. | .03⅝ | @ | .03⅞ |
| Pine, steam distilled gal. | .90 | @ | — |
| Rapeseed, refined ...gal. | .83 | @ | .84 |
| blown .....gal. | .95 | @ | 1.00 |
| Rosin, first rectified gal. | .39 | @ | — |
| second rectified ..gal. | .41 | @ | — |
| Tar, commercial ....gal. | .31½ | @ | — |
| Soya Bean ..... | .12 | @ | — |
| Petrolatum, standard .lb. | .05 | @ | .08 |

### *Resins and Pitches*

| | | | |
|---|---|---|---|
| Cumar resin, hard ..lb. | .09 | @ | .14 |
| soft .....lb. | .09 | @ | .14 |
| Tar Retort .....bbl. | 9.00 | @ | — |
| kiln burned .....bbl. | 9.00 | @ | — |
| Pitch, Burgundy ....lb. | .05 | @ | .06 |
| coal tar .....ton | .01½ | @ | — |
| pine tar ..... | .03 | @ | — |
| Rosin, grade K ....bbl. | 6.35 | @ | — |
| Strained .....bbl. | 6.00 | @ | — |
| Shellac, fine orange ..lb. | .80 | @ | — |

### *Solvents*

| | | | |
|---|---|---|---|
| Acetone, drums .....lb. | .10 | @ | .12 |
| Alcohol, denatured, No. 1 bbls. .....gal. | .32 | @ | .34 |
| Benzol, 90 per cent gal. | .27 | @ | .32 |
| pure .....gal. | .30 | @ | .35 |
| Carbon bisulphide, ..lb. | .06 | @ | .07 |
| tetrachloride .....lb. | .09½ | @ | .10½ |
| Dimethylaniline .....lb. | .35 | @ | — |
| Motor gasoline, steel bbls. .....gal. | .25 | @ | — |
| Naptha, V. M. & P. gal. | .24 | @ | — |
| Toluol, pure .....gal. | .30 | @ | .35 |
| Turpentine, spirits ..gal. | 1.19 | @ | — |
| wood .....gal. | 1.12 | @ | — |
| Paracymene .....lb. | .15 | @ | — |

### *Waxes*

| | | | |
|---|---|---|---|
| Beeswax .....lb. | .38 | @ | .42 |
| Caranuba, No. 1 ....lb. | .16 | @ | .17 |
| Ceresin, white .....lb. | .09 | @ | .10 |
| Bayberry .....lb. | .20 | @ | .24 |
| Montan, crude .....lb. | .03¾ | @ | .04 |
| Ozokerite, black, ....lb. | .15 | @ | .17 |
| green .....lb. | .26 | @ | .27 |
| Paraffine .....lb. | .02¾ | @ | .06⅛ |
| Sweet wax .....lb. | .12 | @ | — |

## SUBSTITUTES

| | | | |
|---|---|---|---|
| Black .....lb. | .08 | @ | .14 |
| White .....lb. | .09 | @ | .16 |
| Brown .....lb. | .10 | @ | .15 |
| Brown factice .....lb. | .08 | @ | .14 |
| White factice .....lb. | .09 | @ | .16 |

## VULCANIZING INGREDIENTS

| | | | |
|---|---|---|---|
| **Lead, black hyposulphite (black hypo) .....lb.** | .25 | @ | .35 |
| **Sulphur chloride (jugs) ..lb.** | .20 | @ | — |
| Sulphur flour pure .....cwt. | 2.60 | @ | 2.90 |
| Bergenport pure ....cwt. | 2.55 | @ | 2.90 |
| superfine, 100 p. c. cwt. | 2.00 | @ | 4.00 |

*Caustic Soda*—There was a fair inquiry for standard brands and large dealers quoted $3.75 ex store. Flake and ground brought $3.65 to $3.90 while 60 per cent test was offered at $2.65.

*Soda Ash*—Domestic demand has been steadily growing and producers have been active supplying material on contract. Light ash in barrels was quoted at $1.95 to $2.30 per 100 pounds.

*Carbon Bisulphide*—The demand from the rubber trade has quieted down. Supplies of this material are not abundant and prices continue steady at 6 to 7 cents per pound.

*Carbon Tetrachloride*—Supplies are in good volume and there is only a routine demand from small consumers. Prices continue at 9½ to 10½ cents per pound.

*Litharge*—There was a quiet market during the period. Prices remain unchanged as follows: Casks, 8½ to 8¾ cents per pound; 100 pound kegs, less than 500 pounds, 12½ cents; 500 to 2,000 pounds, 11¼ cents; 2,000 to 10,000 pounds, 10.8 cents.

*Lithopone*—There was no advance in the price of lithopone although spelter advanced considerably. Producers have been busy all season in supplying the demand. Quotations follow: Domestic 6 cents per pound in bags; car lots, 6¼ cents; barrels, less than car lots, 6½ cents.

*Orange Mineral*—The market was quiet and prices unchanged. Domestic brought 12 to 14 cents per pound; French, 15 cents and German, 14 cents.

*Toluol*—There was an active demand for this material and prices were very firm owing to the absence of large supplies. Quotations were 30 to 35 cents per gallon.

*Benzol*—The demand kept pace with supplies and it was difficult to get any quantity from dealers on spot. Quotations on forward delivery were, pure, 30 to 35 cents per gallon and 90 per cent 27 to 32 cents.

*Barytes*—Consumption continues normal with a good outlook for fall business. Western barytes, f. o. b. works, remained unchanged at $23 per ton.

*Blanc Fixe*–Prices remained unchanged in a market that was very satisfactory to producers. Dry is quoted at 4¼ to 4½ cents per pound and pulp at $40 to $50 per ton.

*Palm Oils*—Supplies are somewhat limited and prices remained steady with small sales of Lagos at 7 cents per pound and Niger at 5¾ cents.

*Whiting*—Business continues up to the season and there was the same sort of demand that has prevailed for some time. Quotations were as follows: Commercial $1.10 per 100 pounds; gilders bolted, $1.15 to $1.25; extra gilders bolted, $1.25 to $1.35; American paris white, $1.35 to $1.45; English cliffstone, $1.70 to $1.90.

# Crude Rubber

NEW YORK, Aug. 14, 1922

THE market is extremely quiet on all grades, and prices are slightly easier, spot rubber ruling at around 14 cents here and 7⅜ pence in London. October/December deliveries are quoted at 14¾ cents in New York and at 8 pence in London. On both sides of the Atlantic the markets seem to be in a mood of "watchful waiting."

One of the leading importers of crude rubber was quoted as saying that it may take two months or more before any plan for restricting production or pooling interests may come into effect, but he thought if it came at all it would be adopted on or before Nov. 1, 1922. He said that apparently seventy per cent of the rubber growers were in favor of some form of restriction, but some of the Dutch planters have assumed a selfish attitude because they have forward contracts to fill at high prices and they want to work these off before committing themselves to any policy of restriction.

The overproduction of tires by the large factories and their desire to reduce present stocks of manufactured goods and raw materials tend to keep buyers out of the market. Some of the tire plants are now running at only seventy-five per cent of capacity, and are buying rubber and fabric very cautiously.

Quotations of this date are practically as follows:

| | | | |
|---|---|---|---|
| **Plantations** | | | |
| Ribbed Smoked Sheets and First Latex, spot | .14¼ | @ | — |
| August/September | .14¼ | @ | — |
| October/December | .14⅜ | @ | .15 |
| January/March | .15¼ | @ | — |
| Amber Crepe No. 1 | .14 | @ | — |
| " " " 2 | .13¾ | @ | — |
| " " " 3 | .13¼ | @ | — |
| Light Clean Thin Brown Crepe | .13¾ | @ | — |
| Commercially Clean Thin Brown Crepe | .13¼ | @ | — |
| Roll Brown Crepe, spot | .11¾ | @ | .12 |
| **Paras** | | | |
| Madeira Fine | .20½ | @ | — |
| Acre Fine | .19½ | @ | — |
| Up-river Fine | .19¼ | @ | — |
| Up-river Medium | .17 | @ | .17½ |
| Up-river Caucho Ball (shipment) | .13½ | @ | — |
| Islands Fine | .17½ | @ | .18 |
| Islands Medium | .16 | @ | — |
| Islands Coarse | .09½ | @ | — |
| Cameta | .09¾ | @ | — |
| Xingu Ball | .11 | @ | — |
| Tapajos Fine | .17½ | @ | .18 |
| **Pontanac** | | | |
| Prime Pressed | .11¾ | @ | — |
| Plantation | .06 | @ | — |
| Bangermassin-Palembang | Nominal | | |
| Siak Gutta Percha | .14¾ | @ | — |
| Prime Macassar | 2.55 | @ | — |
| **Balata** | | | |
| Panama Block | .32 | @ | — |
| Surinam Sheets | .68 | @ | .70 |
| Columbia Block | .42 | @ | .45 |
| Venezuela Block | .49 | @ | .51 |

# Reclaimed Rubber

NEW YORK, Aug. 14, 1922

There is no change in the market situation so far as reclaimed rubber is concerned. The virtually stagnant state of the crude rubber market is reflected in the underlying quietness of this branch of the industry. No immediate activity is anticipated. Buying is confined to absolute needs and those seem to be few.

Quotations of this date are nominally as follows:

| | | | |
|---|---|---|---|
| **Standard Reclaims** | | | |
| Floating | .12 | @ | $.13 |
| Friction | .12 | @ | .13 |
| Boots and Shoes | .09¾ | @ | .10½ |
| Boots and Shoes (washed) | .13 | @ | .14 |
| Mechanical | .08 | @ | .10 |
| Hose | .10½ | @ | .11½ |
| Tires, truck | .09 | @ | .10 |
| Tires, auto | .09 | @ | .10 |
| White | .13 | @ | .14 |

# Scrap Rubber

NEW YORK, Aug. 14, 1922

Some activity in the middle west has been reported on scrap tires and tubes, but in this market interest appears to be confined to future deliveries. More activity in the fall is looked for, but at present those mills which are in the market for scrap in carload lots are buying only futures. One important reason for this is the new freight rate on scrap rubber which goes into effect Aug. 26, placing this commodity in the sixth class and saving shippers of cars from New York to Akron about 6½ cents per hundred pounds over the present rate. Prices in general are off slightly from our previous list.

Quotations of this date (per pound in carload lots delivered, except Mixed Auto which is quoted per ton) are as follows:

| | | | |
|---|---|---|---|
| Auto tire peelings | .01 | @ | Nominal |
| Standard White auto | .01 | @ | Nominal |
| Mixed auto ton | 10.00 | @ | 12.00 |
| Bicycle tires | .00¾ | @ | .00½ |
| Clean solid truck tires | .00¾ | @ | .00⅞ |
| Boots and shoes | .02¼ | @ | .02¾ |
| Arctics, trimmed | .01⅝ | @ | .01¾ |
| Arctics, untrimmed | .01¼ | @ | — |
| Inner tubes, No. 1 | .03 | @ | .03¼ |
| Inner tubes, compounded | .01¾ | @ | .01⅞ |
| Inner tubes, red | .02⅜ | @ | .02½ |
| Battery jars, clean hard rubber | .01 | @ | .01¼ |
| Heels and pads | Nominal | | |
| Black mixed | .00¼ | @ | — |
| Garden hose | .00½ | @ | — |
| Air brake hose | .00½ | @ | .00⅝ |
| Red packing | .00¾ | @ | .01 |
| Red mixed rubber | .01¼ | @ | .01½ |
| White mixed rubber | .01½ | @ | .01¾ |

# New Incorporations

## DELAWARE

The Clinton Tire & Rubber Co., to manufacture tires etc. $100,000. Principal office, Dover, Delaware. Agent, United States Corporation Co.

Brookland Auto Service Co., to manufacture tires, tubes and rubber goods. $25,000. Incorporators: J. E. Kauffman, Merchants National Bank Building, Washington, D. C.; W. W. Cole and C. J. Bean, 820 Michigan avenue, Washington, D. C.

Middletown Tire & Rubber Corporation, to deal in tires. $4,000. Incorporators: C. R. Bishop, A. M. Fox and R. H. Ocheltree—Wilmington, Delaware. Delaware agent, Delaware Charter Co., 904 Market street, Wilmington, Delaware.

Hercules Rubber Products Corporation, to manufacture rubber goods. Incorporators: Winfield Clearwater, Rutherford, N. J.; Paul M. Richards and George W. Bryan, Brooklyn, N. Y. Agent, U. S. Corporation Company.

Burkoe Tire & Rubber Co., to manufacture tires and tubes. $350,000. Incorporators: C. H. Jarvis, L. B. Phillips and J. M. Satterfield—Dover, Delaware. Delaware agent, United States Corporation Co., Dover, Delaware.

Convoy Corporation, to manufacture tires and tire fabric. $100,000. Incorporators: C. J. Jarvis, L. B. Phillips and J. J. Harnett—Dover, Delaware. Delaware agent, United States Corporation Co., Dover, Delaware.

Paynter Corporation, to manufacture tires, tubes and other rubber products. $300,000. Incorporators: T. L. Croteau, M. A. Bruce, and C. H. Blaske—Wilmington, Delaware.

## ILLINOIS

Hunt-Graham Tire Co., to manufacture tires. $20,000. Incorporators: L. H. Hunt, Eldorado, Kansas; I. A. Graham and E. K. Graham, Aurora, Illinois. Principal office, 293 South Lake street, Aurora, Illinois.

Pathfinder Tire & Rubber Co., to manufacture tires. $1,000. Incorporators: S. H. Silverman, 5056 Thorndale Road, Chicago, Illinois. Principal office 1736 South Michigan avenue, Chicago, Illinois.

Postal Life Syndicate, to manufacture automobile tires. $25,000. Incorporators: P. Reinsburg, R. Reinsburg and E. Klauber—1523 Michigan avenue, Chicago, Illinois.

Simmons Tire Corporation, to manufacture tires. $100,000. Incorporators: C. E. Tracy, H. S. Tracey, H. L. Feigenholtz—Chicago, Illinois. Principal office, 111 West Monroe street, Chicago, Illinois.

Stover Rubber Co., to manufacture tires. Incorporators: M. C. Suhr, E. E. Levy and I. K. Stover. Principal office, 1409 South Michigan avenue, Chicago, Illinois.

## KENTUCKY

Short's Tire Service, to deal in tires. $100,000. Incorporators: I. T. Short, H. A. Short and C. V. Lusske—Louisville, Kentucky. Principal office, Lousville, Kentucky.

## MASSACHUSETTS

Cushion Shoe-Tread Co., to manufacture rubber parts of boots and shoes. $100,000. M. D. Riso, 207 North St., Boston, Massachusetts, president; R. C. Martini, treasurer, G. Avallone, P. Dei Buono— Boston, Massachusetts. Principal office, Boston, Massachussets.

F. A. Parker Co., to deal in rubber footwear. $50,000. F. A. Parker, Jr., president; A. L. Robinson Jr., treasurer; W. H. Vincent, secretary—Boston, Massachusetts. Principal office, Marblehead, Massachusetts.

## MISSOURI

Poplar Bluff Rubber Co., to manufacture inner tubes. $100,000. I. H. Patterson, president; R. E. Niemann, vice president; W. E. Morrison, vice president; C. B. Coleman, secretary and treasurer. Principal office, Poplar Bluff, Missouri.

## NEW JERSEY

Roy Rubber Co., to deal in rubber goods. $100,000. Incorporators: Minnie S. Royal, Morrisville, Pennsylvania; Herbert W. Backes, Edward L. Royal. Principal office, Trenton, New Jersey.

The Ace Rubber Co., to manufacture and sell tires and tubes. $50,000. Incorporators: C. A. Wilson and E. H. Unkles—Trenton, New Jersey; C. H. Lambelet and C. W. Keuffel—Weehawken, New Jersey. Principal office, Union, New Jersey.

Spartan Rubber Co., to manufacture tires and tubes. A. Newman, president; E. D. Newman, vice president and S. Newman, treasurer. Principal office, 33 West State street, Trenton, New Jersey.

## NEW YORK

Rochester Rubber & Textile Co. $1,500,000. Principal office, Rochester, New York.

J. C. Seitz & Co., to manufacture tires and tubes. $200,000. Incorporators: J. C. and E. W. Seitz, F. Robinson. Attorneys Dirnberger & Moore, Buffalo, New York.

Smith Rubber Products Sales Corp. to manufacture tires. $25,000. Incorporators: N. Levy, M. Didshun, H. Swiryn. Attorney, L. Soll, 291 Broadway, New York.

Sound Rubber Sales Corporation. $5,000. Incorporators: P. H. Latus, J. F. Dempsey, and W. H. Phillips. Attorney, W. R. Klein, Floral Park. Principal office, Rockville Center, Long Island, New York.

Non-Tube Tire Co. Inc., to manufacture tube less rubber tires. $100,000. Incorporator: I. F. Trautman, 1909 52nd street; William J. O'Farrel, 1387 Coney Island Avenue and Charles Stork, 798 St. John's place—Brooklyn, New York.

Dixon Rubber Co., to deal in tires, rubber goods etc. $5,000. Incorporators: G. P. Branberger, 745 Magee avenue, Elizabeth, N. J.; H. Rubenoff, 2315 Andrews avenue, and E. J. Kleinfeld, 530 West 174 street, New York City.

Kay Rubber Corporation, to manufacture rubber apparel. $4,000. Incorporators: H. Kottler, 1325 47 street; B. Feigenbaum, 1648 78th street; M. Schimelman, 2222 Surf avenue—Brooklyn, N. Y. Principal office, Brooklyn, New York.

Newport and Rosenthal, to manufacture tires. $5,000. Incorporators: R. Newport, 507 West 112th street, New York City; J. Rosenthal, Hotel St. George, Brooklyn, N. Y.; C. F. Rosenthal, 138 Heyward street, Brooklyn, N. Y.

Palladium Tire Co., to deal in tires. $2,000. S. B. Lesselbaum, W. W. Lesselbaum and F. Druss—New York City.

Non-Puncure Tire Co., to manufacture tires. $50,000. Incorporators: G. A. Reynolds, G. A. Reynolds, Jr. and F. H. Wilbur—Binghamton, New York. Principal office, Binghamton, New York.

## NORTH CAROLINA

Citizens Tire & Auto Supply Co., to deal in tires. $100,000. Incorporators: L. D. Walker, R. Sams and C. M. Strong—Charlotte, North Carolina. Principal office, Charlotte, North Carolina.

## OHIO

Chemical Rubber Co. $5,000. Incorporators: Harry Wolpow and M. Junke. Principal office, Cleveland, Ohio.

A. C. Rubber Co., to manufacture rubber heels, balloons etc. Incorporators: W. R. Huntington, G. W. Dewhurst, M. Wilder, J. A. Elbert and F. A. Stetson. Principal office, North and Lodi streets, Elyria, Ohio.

Fidelity Service and Adjustment Company, to deal in tires and tubes. 2000 shares no par value. Incorporators: H. F. Daunch, W. W. Pleasant, E. L. McLeary, P. Ackerman and E. C. Baver. Principal office, Schwind Building, Dayton, Ohio.

The Iten Fibre Co., to manufacture rubber products. $50,000. Incorporators: C. J. Iten, J. P. Thompson, W. J. Dawley, E. K. Curtiss and G. S. Myers. Principal office, Cleveland, Ohio.

Kirchner Tire & Supply Co., to manufacture tires and tubes. $10,000. Incorporators: A. Silverstein, B. Fletcher, H. Kirchner, W. C. Groh and J. W. Cowell. Principal office, 1003 Race street, Cincinnati, Ohio.

Singleton Tire Co., to deal in tires. $10,000. Incorporators: H. T. Singleton, W. F. Frye, G. W. Cowell, G. F. Stolman and P. S. Lietz, Principal office, Cleveland, Ohio.

Washington Rubber Co., to manufacture rubber products. $30,000. Incorporators: G. Masion, T. P. Tyrell and M. M. Tyrell. Principal office, 760 Washington street, Akron, Ohio.

Oak Hill Rubber Co. $175,000. Principal office, Oak Hill, Ohio.

Chemical Rubber Co., to manufacture rubber goods. $5,000. Incorporators: Harry Wolpow and M. Jenks.

Supreme Rubber Products Co., to manufacture and sell rubber products. $25,000. Incorporators: R. H. Rhotehamel and C. A. Miller. Principal office, Cleveland, Ohio.

Bucher Sales Co., to deal in tires and accessories. $25,000. Incorporators: L. C. Taylor, G. W. Bucher, J. D. Bucher, S. W. Bucher and B. S. France. Principal office, New Philadelphia, Ohio.

Heavy Duty Apron & Rubber Co., to manufacture rubber aprons and other rubber products. $5,000. Incorporators: S. N. Paradise, B. Paradise, L. N. Arenson, E. Arenson and N. Arenson. Principal office, Akron, Ohio.

Huebner Tire & Supply Co., to deal in tires etc. $10,000. Incorporators: H. E. Huebner, R. Huebner, H. L. Huebner and C. Huebner. Principal office, 447 Michigan street, Toledo, Ohio.

## PENNSYLVANIA

Atlas Asbestos Co., to deal in asbestos and rubber goods. $25,000. Incorporators: J. C. Johnston, W. Johnston and H. L. Johnston—Norristown, Pennsylvania.

## TENNESSEE

Bartling Tire Co., to deal in tires. $5,000. Incorporators: E. F. and M. L. Bartling, E. L. Pecherell, R. G. Brown and L. Smith. Principal office, Mephis, Tennessee.

Old Hickory Tire & Tube Co., to distribute tires and tubes. $6,000. V. J. Rotero, president; C. Rotero, secretary and treasurer. Principal office, 1159 Broadway, Nashville, Tennessee.

## WISCONSIN

Diestler Tire Co., to manufacture tires. $25,000. Incorporators: H. O. Diestler, H. A. Diestler and V. M. Diestler. Principal office, Kenosha, Wisconsin.

### New Designations

Continental Rubber Works, Pennsylvania. New representative, N. A. Casey, 41 Warren St., New York City.

Buckeye Rubber Products Co., Ohio. New representative H. D. Folger, 527 West 23rd street.

### Capital Increases

Continental Rubber Co. of New York, Manhattan, $50,000 to $370,000.

International Rubber Co., of America, Cleveland, Ohio, from $20,000,000 to $23,000,000.

### Dissolution

Perfection Tire & Rubber Co., Brooklyn, N. Y.